El Centro, California

2005 Urban Water Management Plan

FINAL

March 2006

City of El Centro, California

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2005 Urban Water Management Plan
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The Water supplier is a: **Municipality, retailer**

Utility services provided by the water supplier include: **Water, Sewer**

Is This Agency a Bureau of Reclamation Contractor? **No**

Is This Agency a State Water Project Contractor? **No**

Introduction

Urban water suppliers are required by the Urban Water Management Planning Act to update their Urban Water Management Plan (UWMP) and submit a complete plan to the California Department of Water Resources (DWR) every five years. Urban water suppliers are defined as a public or private owned water system that provides water for municipal purposes to more than 3000 customers or supplies more than 3000 acre/feet annually. An UWMP is required in order for a water supplier to be eligible for DWR administered State grants and loans and drought assistance. What this means to the City of El Centro is that to continue State Revolving Fund (SRF) funding for the new Water Treatment and Production Facility an updated UWMP must be maintained. The 2005 UWMP must be adopted by resolution by the City Council and is due December 31, 2005 to the DWR for review.

The purpose of this report is to review the overall supply and demand of water for the City of El Centro, identify any possible deficiencies in the water supply for the next 25 years, and prepare mitigation strategies. There is no foreseeable water shortage in the City of El Centro for the next 25 years. The City of El Centro uses surface water supplied by the Colorado River that can supply the City with sufficient water to meet all projected demand. Thus the City is not affected by climatic related supply shortages. Although California experienced a prolonged drought from 1987 through 1992, the drought did not affect the City's water supply.

An awareness of the importance of a sound Water Policy is important in recognizing that water in California is becoming a scarce resource. Land use decisions based in part upon water resources have significant effects on the physical, social, and economic character of the county. Although the Urban Water Management Plan is concerned with long range goals and objectives, attention should also be given to currently existing conditions and issues. This approach will enable the City to face important issues today, thereby avoiding problems in the future.

In addition to the statement of goals, objectives and policies, the Urban Water Management Plan includes discussions, data, and water conservation programs which provide for the prudent and conscientious management and utilization of water resources for future development in the City. The implementation of the Urban Water Management Plan is meant to assure that water resources are conserved and utilized as possible, and to provide for the long-term viability and availability of this precious resource.

City of El Centro Background

Over the past fifty years, the City of El Centro has developed as a major government and commercial center for the Imperial Valley in southern California. Although surrounding agricultural activities remain a major part of the City's economy, the government and wholesale/retail trade within the city have promoted its growth. In this time period, growth has tripled to an estimated population of 38,000 in 1999. During the past twenty years, separate water and wastewater master plans were prepared that evaluated the capabilities of facilities to meet service requirements.

An updated single master plan report was prepared in 2001 to evaluate the current conditions of water and wastewater infrastructures and make recommendations on facility improvements. This document was used in the preparation of this report.

The City provides potable water to homes and businesses by treating Colorado River water imported by the Imperial Irrigation District (IID). The imported water is a surface water source. Its treatment must comply with the Surface Water Rule of the Federal and State Safe Drinking Water Act. The California Department of Health Services (DHS) granted a permit (No. 81-029) to the City of El Centro in June of 1981 to supply water for domestic purposes to the City of El Centro. The treatment facility currently meets all applicable State Department of Health Services and United States Environmental Protection Agency domestic water quality standards. See the Appendix for a copy of the DHS permit and annual Consumer Confidence Reports.

The water facilities include infrastructure for treatment, storage, and distribution. The water treatment plant consists of two raw water reservoirs, two clarifiers, a filtration system, and chlorination. The distribution system consists of a network of pipelines and two pumping facilities. Four treated water storage tanks supply water to the distribution system. Three tanks are located at the treatment facility and the fourth is located at La Brucherie Road and Barbara Worth Avenue.

The City of El Centro is currently in the design phase of a water plant expansion that will address concerns regarding storage and filtration. El Centro is in an active earthquake region. There is concern that a major earthquake or other emergency affecting the IID water supply could require the City to rely on raw water from storage for more than a week. The City's current available storage may be less than the volume necessary for seven days of peak summer water demand. Also, portions of the water treatment facilities that are original to the plant may be approaching the limit of their operational life. The lack of redundancy in treatment components is also being addressed. Redundant components allow emergency repairs or unanticipated maintenance on other similar treatment units without reducing production capacity. Filtration is considered the most vital treatment process in meeting present and anticipated new requirements.

The City is located in the Imperial County. The Imperial County has been known for many years as a Mecca of raw water resources. Through the combined efforts with Federal, State, County and Local agencies, Imperial County will continue to enhance and utilize its water resources to accommodate future growth and establish a strong economy.

Since its inception, the history of Imperial County has been tied to the availability of water for agriculture. Agriculture is the County's main economic activity for the foreseeable future. The availability of water will play an important role in determining the population and economic growth of Imperial County.

The City of El Centro receives raw water from the Imperial Irrigation District. Less than two percent of the Imperial Irrigation District's untreated water is ultimately used for urban purposes and is provided indirectly to consumers through a variety of public and private treatment agencies.

Under a worst case water supply scenario the Imperial Irrigation District is confident that urban water users (which comprise less than two percent of its annual water

deliveries) can be assured delivery of their required water supply. Due to its present perfected water rights and the relatively small water demand of non-agricultural water users, the Imperial Irrigation District would not reduce or cut back urban water deliveries even in years of reduced deliveries. Since its inception in 1911, the Imperial Irrigation District has never been denied the right to divert the amount of water it has requested for agricultural purposes and other beneficial uses.

Possible disruption events in the water supply include earthquakes, water pollution and power outages. In the event of a catastrophic water supply interruption, the City could divert irrigation water into the potable water distribution system. Under this scenario non-potable water would be delivered to City customers and the water would have to be boiled by each customer prior to potable use. The non potable water could be delivered by diesel powered pumps to the City's distribution system.

A big portion of the water demand in the Colorado Basin area is for irrigation, due to the arid and warm conditions. Recycled water can be used for this; however the use of recycled wastewater is not cost effective option at this time. An expanded water conservation program is one of several priorities supported by the City, and conservation programs such as school education, public information, and landscape design and water use standards are being implemented.

Public Participation

Law

> 10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published … After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

Public Participation

The City of El Centro encourages community participation in its urban water management planning efforts. Public meetings were held on the 2005 plan in June 2006.

Before adoption of the Urban Water Management Plan, a public meeting was held. A formal public session was held during a regular meeting of the City Council for review and comment on the draft plan before the City Council's approval. Public interest groups that participated in the development of the plan are listed in Appendix A.

Legal public notices for this meeting were published in the local newspaper. Copies of the draft plan were available at City Hall. Public notice was given declaring the availability of the Management Plan for public inspection and stating the public hearing date and time. A public hearing for the Management Plan was held by the El Centro City Council. The final Management Plan will be issued after the public hearing. The final Management Plan will be distributed to the cities of Brawley, Calexico, Calipatria, El Centro, Holtville, Imperial, and Westmorland; Imperial County Planning/Building and Public Works Departments; Imperial Irrigation District's Public Affairs; public libraries in the cities of El Centro, Calexico, Brawley, and Imperial; and to others upon request.

Plan Adoption

The City of El Centro prepared its Urban Water Management Plan during December 2005. The plan was adopted by City Council in June 2006 and submitted to the California Department of Water Resources within 30 days of Council approval. Attached to the cover letter addressed to the Department of Water Resources and as Appendix B are copies of the signed Resolution of Plan Adoption. This plan includes all information necessary to meet the requirements of California Water Code Division 6, Part 2.6 (Urban Water Management Planning).

Agency Coordination

Law

> 10620 (d) (2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

Coordination within the City

The development of this plan was coordinated with the City Staff, the Mayor's Office, City Planning, Fire, Building, Police, and local Emergency Services offices.

Drafts of the Management Plan were distributed to Imperial Irrigation District, the Imperial County Planning/Building and Public Works Departments, and the City of El Centro for review and revisions. The final draft was distributed in January 2006 to the Imperial Irrigation District and the cities of Brawley, Calexico, Imperial and Imperial County staff for agency comments and recommendations. Comments and recommendations were incorporated into the Management Plan. Copies of the Management Plan were distributed to Imperial County Planning/Building and Public Works Departments; Imperial Irrigation District's Public Affairs; cities of Brawley, Calexico, Calipatria, Holtville, Imperial, and Westmorland; the public libraries of El Centro, Calexico, Brawley, and Imperial; and to others on request for public review.

Interagency Coordination

Table 1 summarizes the efforts El Centro has taken to include various agencies and citizens in its planning process.

Table 1. Coordination and Public Involvement						
Entities		contacted for assistance	made copy of draft plan available	Commented on the draft	Attended public meetings	sent a notice of intention to adopt
Wholesaler – Imperial Irrigation District		✓	✓			
County of Imperial		✓	✓			
City of Calexico - Retailer		✓	✓			
City of Brawley - Retailer		✓	✓			
City of El Centro Staff		✓	✓	✓	✓	
General Public		✓	✓		✓	✓
Salton Sea Authority		✓	✓			

Supplier Service Area

Law

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

10631. (a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

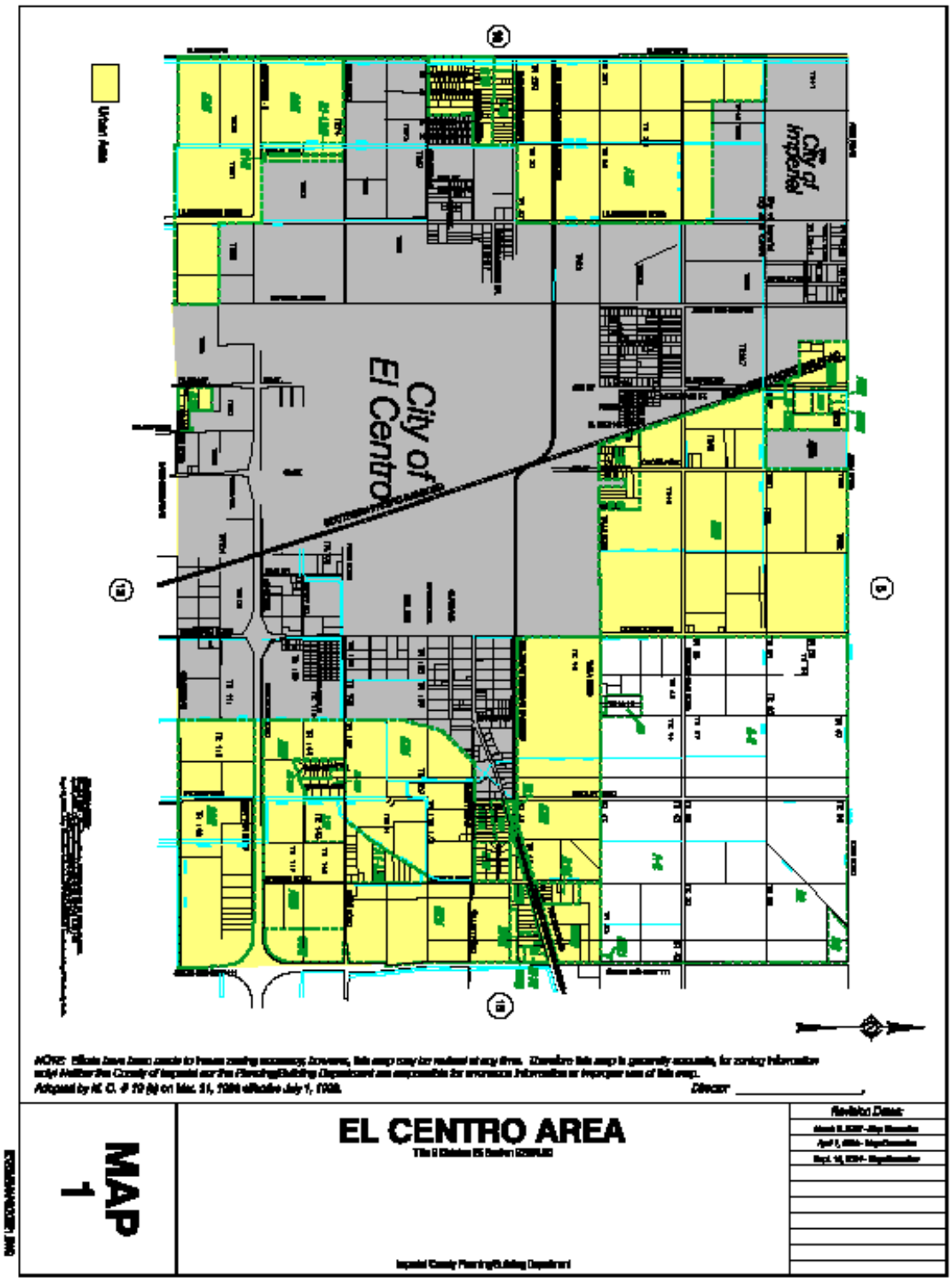
LOCATION

Figure 1 - El Centro Location Map

The City of El Centro, in the County of Imperial, is located along Interstate 8, approximately 120 miles east of San Diego. See Figure 2 for El Centro Urban Area. The City of E1 Centro is located at the intersection of Interstate 8 and Highway 86 and covers 9.2 square miles. The Imperial County seat is located in the City of El Centro. El Centro is the largest city in the county and is the principal trading center of the county. Several federal and state government offices are located in El Centro, such as the U. S. Bureau of Land Management, Federal Bureau of Investigation, U.S. Border Patrol Headquarters, Social Security Administration, U.S. Department of Agriculture, and the California Employment Development Department.

The City of El Centro Urban Area is approximately 12,800 acres and surrounds the incorporated City of El Centro. The El Centro Urban Area is generally bounded on the west by Austin Road; on the north by the Central Drain, Dogwood Road, and Villa Road; on the east by State Highway 111; and on the south by Northrop Road (extension), McCabe Road, a line approximately 1,320 feet east of Dogwood Road, and Chick Road. See Figure 2 for El Centro Urban Area.

Figure 2 - El Centro Urban Area


Urban Area
City of El Centro
City of Imperial
MAP 1
EL CENTRO AREA

The City of El Centro is located in Imperial County, which is located in the southeast comer of California. It is bordered on the west by San Diego County, on the north by Riverside County, on the east by the Colorado River which is the California/Arizona boundary, and on the south by 84 miles of the International Boundary with the Republic of Mexico. The Imperial County encompasses an area of 4,597 square miles or 2,942,080 acres.

The geographic center of the Imperial Valley is one of the finest agricultural areas in the world, despite the fact that it is in a very arid region. The general area of the Imperial Valley, also known as the Imperial Unit, is bounded on the north by the south shore of the Salton Sea, on the south by the All-American Canal, on the east by the East Highline Canal, and on the west by the Westside Main Canal.

Approximately fifty percent of lands in Imperial County are undeveloped and are under federal ownership and jurisdiction. One-fifth of the nearly 3 million acres in Imperial County are irrigated for agricultural purposes, most notably the central area known as Imperial Valley. The Imperial Valley irrigated agriculture consists of 512,163 acres (Imperial County General Plan, 1998, Overview p. 7).

The developed area within the Imperial Valley represents less than one percent of the total amount of land. Approximately seven percent of Imperial County is within the boundaries of the Salton Sea.

The City receives water from the Imperial Irrigation District. The Imperial Irrigation District's irrigation total service area, lying entirely within Imperial County, is divided into four units: Imperial, West Mesa, East Mesa, and Pilot Knob, with a gross acreage of 1,061,637 acres.

The City of El Centro’s sphere of influence is located within the Imperial Valley and is defined as the Imperial Unit of the Imperial Irrigation District's Irrigation Service Area (Imperial Unit). The Imperial Unit includes the urban areas for the cities of El Centro,

Calexico, and El Centro and part of Imperial County's unincorporated area. The Management Plan's water supplier service area, also known as the Imperial Unit, has a total area of 694,346 acres.

A significant amount of water that is delivered is for agricultural purposes. The causes of the agricultural success of this region are two-fold: the rich soils which have accumulated on the valley floor over thousands of years; and the large quantity of water that is transported from many miles east via the All-American Canal, and subsequently distributed to farmlands by a complex system of smaller canals.

A significant geographical feature in the County is the Salton Trough, which contains the Salton Sea and the Imperial Valley, and has been evolving for millions of years. It is a "rift" in the earth's crustal plates. The East Pacific Rise is the boundary between the Pacific and North American Plates. It extends up the Gulf of California by a series of "spreading centers" with strike slip faults. The thinning of the crust from the slow but continuous widening of the Salton Trough causes the earth's magma to rise closer to the surface and generates abnormally high heat flow, which in turn heats deep ground waters.

The trough is a structural extension of the Gulf of California. In prehistoric times it contained the ancient Lake Cahuilla (not to be confused with the present Lake Cahuilla which is located at the terminus of the Coachella Branch of the All-American Canal).

The Imperial Valley was created when the Colorado River formed a delta that isolated the Salton Trough from the Gulf of California. Subsequently, under desert conditions, the inland sea dried up. Later, the trough was occupied by lakes for various periods, and deposition into these lakes gave the valley its characteristic flat lands and fertile soils.

CLIMATE FACTORS

Imperial Valley elevations range from sea level to 273 feet below sea level. The Mexican Border is located at the southern end of Imperial Valley and the elevation is sea level. The southern end of the Salton Sea is located at the northern end of Imperial Valley and the elevation is 273 feet below sea level. The relatively flat topography of the Imperial Valley and surrounding areas in conjunction with strong night and day temperature differentials, particularly in the summer months, produce moderate winds and deep thermal circulation systems. The thermal systems facilitate general dispersion of the air.

Climate

The Imperial County is considered an arid desert, characterized by hot, dry summers and mild winters. Summer temperatures typically exceed 100 degrees Fahrenheit and the winter low temperatures rarely drop below 32 degrees Fahrenheit. The remainder of the year has a relatively mild climate with temperatures averaging in the mid-70s. The average annual air temperature is 72 degrees Fahrenheit and the average frost-free season is about 300 days per year.

Annual rainfall in the Imperial Valley averages less than three inches, with most rainfall associated with brief but intense storms. The majority of the rainfall occurs from November through March. Periodic summer thunderstorms are common in the region.

Table 2. El Centro Climate Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	69.7	74.0	79.4	86.3	94.5	103.6	107.6	106.4	102.2	91.7	78.4	69.8	88.6
Average Min. Temperature (F)	40.2	43.8	47.9	53.0	59.8	67.3	75.3	75.7	69.4	58.6	46.9	39.8	56.5
Average Total Precipitation (in.)	0.46	0.33	0.24	0.07	0.02	0.00	0.08	0.32	0.24	0.29	0.20	0.35	2.59

Source: http://www.wrcc.dri.edu/CLIMATEDATA.html

Prevailing Winds

Wind data from NAF El Centro that is used at El Centro Municipal Airport, show that the prevailing winds blow in a western direction. A crosswind occasionally blows in a southeast direction.

DEMOGRAPHIC FACTORS

Population

The Population Research Unit of the California Department of Finance *(DOF)* estimates annual changes in population. According to the DOF estimates, Imperial County's 2005 unincorporated area population is 34,794 and Imperial County's total population is 161,800 (State of California Department of Finance). This compares to the 2000 census results of 32,583 people for Imperial County's unincorporated area and 142,361 people for Imperial County's total population. The increase of 19,439 people is a 13 percent increase over Imperial County's 2000 population, or 2.5% annually.

According to DOF January 2005 estimates, City of El Centro's 2005 population is 40,386 with 12,180 housing units. Between the years of 2000 to 2003 there was little growth. The growth in this time rage varied between 0.5% and 1.5%. There was not much development during this period.

During the year 2003 development began in earnest in Imperial County. The total County population increased by 3.0% from 2004 to 2005. The growth in the City of El Centro between January 2004 and January 2005 was 2.4%. Population increases in the City of El Centro for the years between 2005 and 2025 are estimated to be 1.1% compounded annually by The Southern California Association of Governments (SCAG). The population projections stem from incoming development and industry to the City of El Centro.

Table 3, Current and Projected Population, is from the SCAG 2004 Regional Transportation Plan (RTP) Adopted Forecast, April 2004.

Table 3. Current and Projected Population

	2005	2010	2015	2020	2025
City of El Centro	40,386	42,829	45,311	47,760	50,109
# Households in El Centro	12,180	13,533	14,560	15,545	16,536

Population figures were obtained from the Southern California Association of Government (SCAG), 2004 RTP Adopted Forecast, April 2004 unless otherwise noted. These figures may vary from previous reports due to changes in estimates, projection, and populations.

Table 4. Selected County Pop. Estimates with Annual Percent Change January 1, 2004 and 2005

County	Total Population 01/01/04	01/01/05	Percent Change
ALAMEDA	1,496,968	1,507,500	0.7
ALPINE	1,265	1,262	-0.2
AMADOR	37,216	37,574	1.0
BUTTE	212,237	214,119	0.9
CALAVERAS	43,995	44,796	1.8
COLUSA	20,327	20,880	2.7
CONTRA COSTA	1,008,944	1,020,898	1.2
DEL NORTE	28,557	28,895	1.2
EL DORADO	170,456	173,407	1.7
FRESNO	866,523	883,537	2.0
GLENN	27,824	28,197	1.3
HUMBOLDT	130,392	131,334	0.7
IMPERIAL	**157,064**	**161,800**	**3.0**
Total State of CALIFORNIA	36,271,091	36,810,358	1.5

Table 5. Imperial County City Populations – Department of Finance (DOF) State of California

CITY	04/01/00	01/01/01	01/01/02	01/01/03	01/01/04	01/01/05
BRAWLEY	22,052	22,379	22,553	22,811	23,513	24,042
CALEXICO	27,109	28,066	29,857	32,128	34,420	36,274
CALIPATRIA	7,289	7,282	7,620	7,663	7,808	7,904
EL CENTRO	38,025	38,499	38,833	39,496	40,047	41,030
HOLTVILLE	5,612	5,678	5,708	5,730	5,753	5,745
IMPERIAL	7,560	7,771	8,132	8,554	9,326	9,567
WESTMORLAND	2,131	2,176	2,200	2,209	2,221	2,444
BALANCE OF COUNTY	32,583	33,063	33,181	33,720	33,976	34,794
INCORPORATED	109,778	111,851	114,903	118,591	123,088	127,006
COUNTY TOTAL	142,361	144,914	148,084	152,311	157,064	161,800

Table 6. TOTAL POPULATION PROJECTIONS FOR IMPERIAL COUNTY - DOF

	2000	2010	2020	2030	2040
IMPERIAL	143,660	178,201	214,386	254,989	296,656

Land Use

The Imperial Valley is predominantly an agricultural area. Agricultural development in the Imperial Valley began at the turn of the twentieth century and now includes approximately 500,000 acres of irrigated land that support a $1 billion annual local agricultural economy. Imperial Irrigation District is the regional water supplier in Imperial County, delivering Colorado River flows to all agricultural lands and urban water retailers within its contracted water service area. The Imperial Irrigation District

operates open channel gravity flow irrigation and drainage systems and continually strives to develop innovative ways to improve its operations, increase reliability, and to conserve water.

While the agriculture-based economy is expected to continue, land use will vary somewhat over the years as urbanization and growth occurs in the rural areas adjacent to existing urban areas.

Current Land Use

Agriculture is the predominant land use in the Imperial Valley with approximately seventy percent utilized for agricultural purposes. A mild climate, year-round growing season, good soils, and a gently sloped topography combined with the strong historical Colorado River water rights make Imperial Valley one of the most productive agricultural regions in the world. Due to contractual restrictions total farmable acres have remained fairly constant over the past five years while total net acres cropped have exhibited minor fluctuations. Cropping patterns have remained relatively constant with yearly variations occurring as a result of market price fluctuations, production cost factors, and insect/disease pressures.

There is a trend towards forage crops and away from vegetable crops. More than 120 types of crops are currently grown. In terms of acreage, the major crops within Imperial Irrigation District boundaries are alfalfa, bermuda, wheat, sugar beets, lettuce, melons, Carrots, onions, and broccoli. In the Imperial Valley, the total area farmed was 488,499 acres in 1990, 481,151 acres in 1995, and 479,000 acres in 2000 (Imperial Irrigation District, 2000).

Urban land uses within the Imperial Unit consist of cities, state prisons, a military base, geothermal plants, and other smaller industrial users. Most of the urban lands are concentrated in and around the incorporated and unincorporated cities with some small clusters of rural residences located away from the population centers.

Table 7. IMPERIAL COUNTY Land Use Distribution (in Acres)

Irrigated (Agriculture)		
	Imperial Valley	512,163
	Bard Valley (Including Reservation)	14,737
	Palo Verde Valley	7,428
	Total	534,328 (18.2%)
Developed		
	Incorporated	9,274
	Unincorporated	8,754
	Total	18,028 (0.6%)
Salton Sea**		211,840 (7.2%)
Desert/Mountains		
	Federal	1,459,926
	State	37,760
	Indian	10,910
	Private	669,288
	Total	2,177,884 (74.0%)
IMPERIAL COUNTY TOTAL		2,942,080 Acres

* All acreages are approximations and should, therefore, only be used for informational purposes.

** Calculated at elevation of -230.

Source: Imperial County General Plan, County Overview-September 1985.

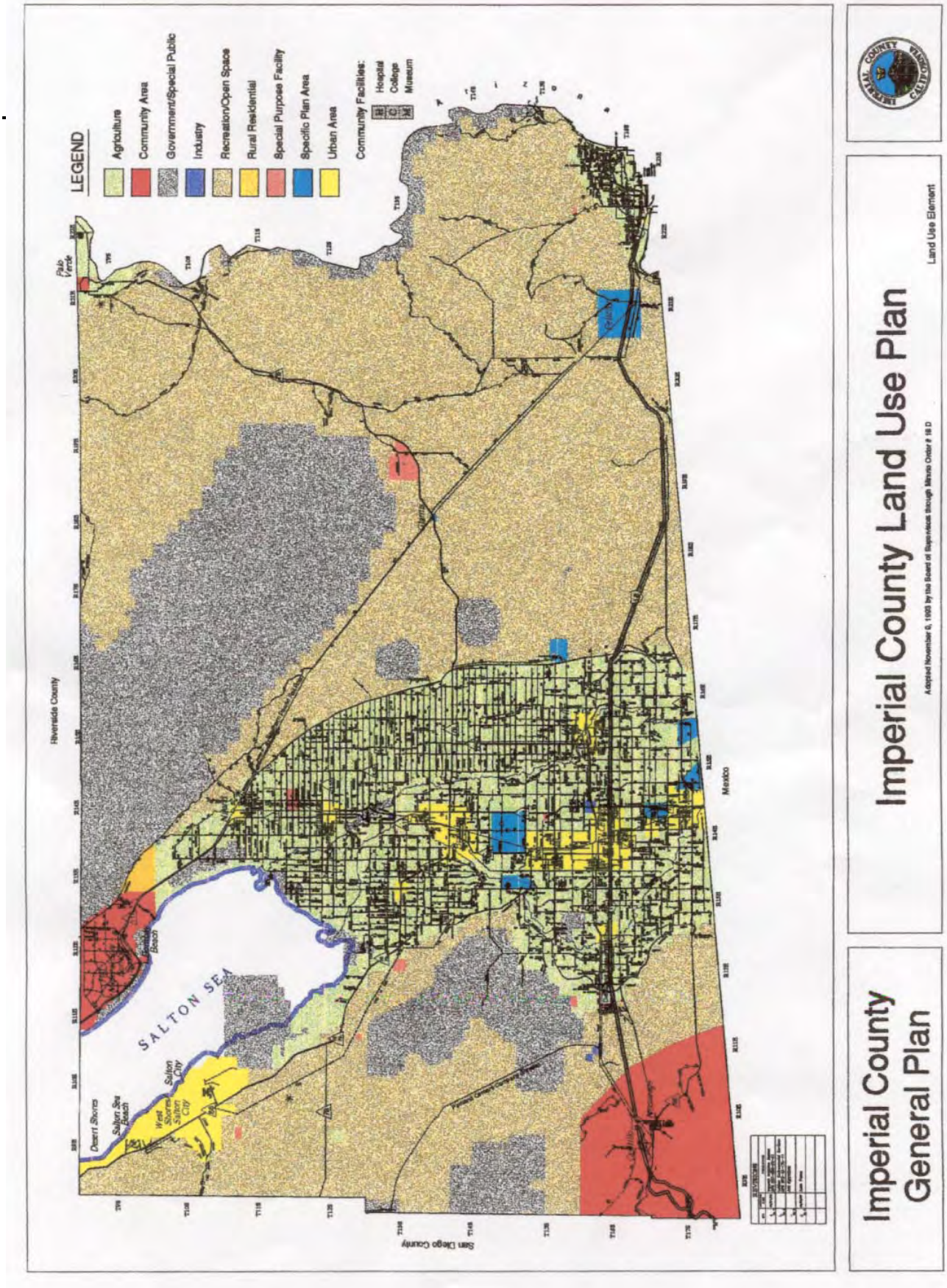


Figure 3 - Imperial County Land Use Plan Map

Future Land Use

The Imperial County General Plan, updated September 2004, identifies urban areas surrounding the incorporated cities of Brawley with 9,890 acres, Calexico with 6,980 acres, Calipatria with 2,880 acres, El Centro with 16,000 (City of El Centro Draft General Plan, June 2003) acres, Holtville with 4,080 acres, Imperial with 8,480 acres, and Westmorland with 880 acres. Urban areas surrounding the unincorporated communities include Heber with 960 acres, Niland with 1,290 acres and Seeley with 1,520 acres. Urban areas for specific plans located within Imperial Unit boundaries include: East Border Crossing Specific Plan area with 1,700 acres, Holtville Air Strip Specific Plan area with 1,830 acres, Mesquite Lake Specific Plan area with 5,760 acres (9 sq miles), and Heber Specific Plan area with 4,770 acres. Some of these designated urban areas have been developed and some have not. Some of these areas could possibly complete developments in the future.

The total urban areas surrounding cities and communities located within the Imperial Unit is 52,960 acres or 7.6 percent of the Imperial Unit area. The majority of these lands are currently farmed. Four Specific Plan Areas within the Imperial Unit are designated for possible development. The total area within the four Specific Plan Areas is 14,060 acres or 2.0 percent of the Imperial Unit area. The total combined urban area surrounding cities and communities and for the four Specific Plan Areas is 67,020 acres or 9.6 percent of the Imperial Unit area.

Urban areas yet to be developed will be characterized by a full level of urban services, in particular public water and sewer systems, and will contain or propose a broad range of residential, commercial, and industrial uses. It is anticipated that most urban developments, yet to be developed, will eventually be annexed or incorporated into existing cities, and provide the full range of public infrastructure normally associated with municipalities such as public sewer and water, drainage

improvements, street lights, fire hydrants, and fully improved paved streets with curbs and sidewalks that are consistent with city standards.

Trends in land use point to an increase in the development of existing urban areas to provide for larger residential capacity and increased population. With an increase in the development of existing urban areas, there will be associated increases in service and infrastructure. The total urban land use in the years 2005 through 2030 will remain small in comparison to agriculture land use within the Imperial Unit.

Water Sources (Supply)

Law

> 10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
>
> 10631 (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments [to 20 years or as far as data is available.]

Water Supply Sources

The City of El Centro depends solely on the Colorado River for surface water inflows, supplied by the Imperial Irrigation District. The Imperial Irrigation District imports the raw Colorado River water and distributes it to the City and for agricultural purposes. The City treats the raw water to meet state and federal drinking water standards before distribution.

The City of El Centro has been supplying potable drinking water since the early years of the 1900's when water became available from the Colorado River. El Centro receives its drinking water from the Colorado River via the Imperial Irrigation District's (IID) All American Canal and the Main Canal that run south of the city limits. The Date Canal and the Dahlia Lateral Number 1 run north from the Central Main Canal and supply the water treatment facility. There, the raw water is stored in reservoirs until undergoing treatment.

Water is supplied to the City from the All American Canal and the Central Main Canal, and reaches the water plant through the Date Canal and the Dahlia Lateral Number 1. Both of these canals flow north from the Central Main Canal. The Date Canal runs immediately east of the treatment facility and has capacity to deliver delivering 22.6 mgd of untreated water to the plant.

The Dahlia Lateral Number 1, located west of the plant, is capable of supplying the

plant with an additional 9.0 mgd. The Dahlia Lateral has been used as a water source more during the last few years. This is because it has fewer services drawing water from it than the Date Canal. It maintains a steadier flow and is a more reliable source. The capacity of water delivery from the Dahlia Lateral is limited due to the size of gate 18A and the back pressure of the Lateral. The total amount of raw water that can currently be supplied to the City is 31.6 mgd (35,755 acre feet per year).

Rainfall is less than three inches per year and does not contribute to Imperial Irrigation District's water supply, although at times it may reduce agricultural water demand. The groundwater in the Imperial Unit is of poor quality and is generally unsuitable for domestic or irrigation use.

As the City grows and develops on existing agricultural land, theoretically there will be more water supply available. Agriculture requires much more raw water per acre than developed land.

Water Rights

The Imperial Irrigation District was formed in 1911 to acquire properties of the bankrupt California Development Company and its Mexican subsidiary. By 1922, the Imperial Irrigation District had acquired 13 mutual water companies, which had developed and operated distribution canals in the Imperial Valley. By the mid-I920s, the Imperial Irrigation District was delivering water to nearly 500,000 acres. Since 1942, water has been diverted at Imperial Dam on the Colorado River through the All-American Canal, both of which the Imperial Irrigation District operates and maintains.

The Imperial Irrigation District's rights to divert Colorado River water are long standing. Imperial Irrigation District holds legal titles to all its water and water rights in trust for landowners within the district (California Water Code §§20529 and 22437; Bryant v. Yellen, 447 U.S. 352, 371 (1980), fu.23.). Begilll1ing in 1885 a number of individuals, as well as the

California Development Company, made a series of appropriations of Colorado River water under California law for use in the Imperial Valley. Pursuant to then-existing California laws, these appropriations were initiated by the posting of public notices for 10,000 cubic feet per second (cfs) each at the point of diversion and recording such notices in the office of the county recorder. The individual appropriations were subsequently assigned to the California Development Company, whose entire assets, including its water rights, were later bought by the Southern Pacific Company. After the Imperial Irrigation District was formed in 1911, the Southern Pacific Company conveyed all of its water rights to the Imperial Irrigation District on June 22) 1916.

The Imperial Irrigation Districts predecessor right holders made reasonable progress in putting their pre-1914 appropriative water rights to beneficial use. By 1929, 424,145 acres of the Imperial Valley were under irrigation. Had the Imperial Irrigation District not subsequently modified its pre-19l4 appropriative rights, the Imperial Irrigation District would have perfected its pre-1914 appropriative water right at over 7

million acre-feet annually.

Subsequently, in 1921 representatives from the seven Colorado River basin states with the authorization of their legislatures and at the urging of the Federal government, began negotiations regarding the distribution of waters from the Colorado River. In November of 1922, the representatives from the upper (Colorado, New Mexico, Utah and Wyoming) and lower (Arizona, California, and Nevada) basin states signed the Colorado River Compact (Compact), an interstate agreement giving each basin perpetual rights to annual apportionments of 7.5 million acre-feet of Colorado River water annually.

The Compact was made effective by provisions in the 1928 Boulder Canyon Project Act (45 Statute 1056)) which authorized the construction of Hoover Dam and the All-American Canal and served as the United States' consent to accept the Compact. Officially enacted on June 25,

1929 through a Presidential Proclamation, this act resulted in the ratification of the Compact by six of the basin states and also required California to limit its annual consumptive use to 4.4 million acre-feet of the lower basin)s apportionment, plus not less than half of any excess or surplus water unapportioned by the Compact. Arizona refused to sign and subsequently filed a lawsuit. California abided by this federal mandate through the implementation of its 1929 Limitation Act. The Boulder Canyon Project Act moreover authorized the Secretary of the Interior (Secretary) to "contract for the storage of water. . . and for the delivery thereof. . . for irrigation and domestic uses", and further defined the lower basin's apportionment split by allocating 0.3 million acre-feet of water to Nevada and 2.8 million acre-feet of water to Arizona. While the three states never formally accepted or agreed to these terms, a 1964 Supreme Court decision (Arizona vs. California, 373 US. 546) declared their consent to be inconsequential since the Boulder Canyon Project Act was authorized by the Secretary.

Following the implementation of the Boulder Canyon Project Act, the Secretary requested California make recommendations regarding the distribution of its allocation of Colorado River water. In August of 1931, under the direction of the Chairmanship of the State Engineer, the California Seven-Party Agreement was developed and authorized by the affected parties in order to prioritize California water rights. The Secretary accepted this recommendation agreement and established these priorities (as shown in Table 4.0.1) through General Regulations issued in September of 1931. The first four priority allocations account for California's 4.4 million acre feet allotment, with agricultural entities utilizing 3.85 million acre-feet of that total. The remaining priorities are defined for years in which the Secretary declares that excess waters are available. Finally, it should also be noted that a 1944 treaty entitles Mexico to an annual apportionment of 1.5 million acre-feet of Colorado River water and additional 200,000 acre-feet in years that excess water is available.

Pursuant to the provisions of the Boulder Canyon Project Act adopted in 1929, the California Limitation Act (Act of March 4, 1929; Chapter 16, 48th Session; Statutes and Amendments to the Codes, 1929, p.38-39.), and the Secretary's contracts, California was apportioned an annual 4.4 million acre-feet out of the lower basin allocation of 7.5 million acre-feet annually, plus 50% of any available surplus water. The further apportionment of California's share of Colorado River water was made by the Secretary of the Interior by entering into contracts with California water right holders. On December 1, 1932 the Secretary, acting on behalf of the United States, executed a contract with Imperial Irrigation District to deliver Colorado River water. The Imperial Irrigation District agreed to limit its California pre-1914 appropriative water rights in quantity and priority to the apportionments and priorities contained in the Seven-Party Agreement. Following execution of the Seven-Party Agreement, the Imperial Irrigation District filed eight California applications between 1933 and 1936 to appropriate water pursuant to the California Water Commission Act. The Imperial Irrigation District filed such applications without waiving its rights as a pre-1914 appropriator, and the applications sought rights to the same quantity of Colorado water as had been originally appropriated-over 7 million acre-feet annually. However,

the applications also incorporated the terms of the Seven-Party Agreement, thus incorporating the apportionment and priority parameters of the Seven-Party Agreement into Imperial Irrigation District's appropriative applications. Permits were granted on the applications in 1950.

At the time the Imperial Irrigation District entered into its contract with the Secretary of the Interior, it was anticipated that the lands to be served with Colorado River water in the Coachella Valley to the north would become a part of the Imperial Irrigation District. However, the Coachella farmers eventually decided that they preferred to have .their own delivery contract with the Secretary, and an action was brought by the Coachella Valley Water District to protest the Imperial Irrigation District's court validation of the 1932 Imperial Irrigation District water service and repayment contract with the Secretary of the Interior. In 1934, Imperial Irrigation District and Coachella Valley Water District executed a compromise agreement which paved the way for Coachella Valley Water District to have its own contract with the Secretary provided it subordinated its Colorado River entitlement, in perpetuity, to the Imperial Irrigation District entitlement. In other words, within the third, sixth and seventh priority agricultural pool, as set forth in the Seven-Party Agreement and the various California water delivery contracts, Imperial Irrigation District's water use takes precedence over Coachella Valley Water District's use. Under the third priority Coachella Valley Water District receives water out of the annual 3.85 million acre-feet agricultural pool after water uses by Palo Verde, Yuma Project, and Imperial Irrigation District are deducted.

Both the Colorado River Compact and the Boulder Canyon Project Act contained provisions that required satisfaction of "present perfected rights", or appropriative rights acquired pursuant to state law that were in existence prior to enacting legislation. Imperial Irrigation District's water rights can be classified as two types, "present perfected" and/or "contract." The 1964 Supreme Court decree (Arizona vs. California, 373 U.S. 546), in conjunction with a supplemental 1979 decree (Arizona vs. California, 439 U.S. 419, 429), awarded the Imperial Irrigation District a "present perfected right" to 2.6 million acre-feet of Colorado River Water annually. This legal

decision reinforced the rights to this water that the Imperial Irrigation District had previously established through appropriations based on historical usage. These present perfected rights are essential to the Imperial Irrigation District as they guarantee priority access to Colorado River water before those without these rights (after Mexico's allotment has been satisfied). Of the Seven-Party Agreement entities, only Palo Verde Irrigation District (PVID), Imperial Irrigation District, and the Yuma Project (non-Indian portions) have present perfected rights. Imperial Irrigation District's remaining water allocations are based on "contract rights" from the December 1932 contract with the Secretary of the Interior (as modified by the 1934 Compromise Agreement with Coachella Valley Water District). Contract rights for all California entities are described in Article 17 of the 1932 Contract and in their individual contracts with the Secretary. While signatories to the 1931 Seven Party Agreement, Los Angeles, San Diego, and the County of San Diego have since merged their rights with those of the Metropolitan Water District of Southern California, who originally was granted a fourth priority 550,000 acre-feet allotment of California's 4.4 million acre-feet apportionment.

The water of the Colorado River is used by both the Upper Basin States (Colorado, New Mexico, Utah, Wyoming) and the Lower Basin States (Arizona, California, and Nevada), as well as by Mexico. In accordance with the Colorado River Compact of 1922, the Upper and Lower Basin States are each entitled to the exclusive beneficial consumptive use of 7.5 million acre-feet (MAF) of Colorado River water each year, in perpetuity. In addition, an option is granted to the Lower Basin States for the use of an additional 1.0 MAF for beneficial consumptive use. The 1929 California Limitation Act limits California's annual consumptive usage to 4.4 MAF, plus not more than one-half of any excess or surplus water unapportioned by the Compact.

By treaty signed on February 3, 1944, Mexico is entitled to 1.5 MAF of the Colorado River water each year. In years of low flow, any shortfall required to meet Mexican treaty rights will be made in equal quantities by the Upper and Lower Basin States. This treaty takes precedence over the Colorado River Compact of 1922.

In 1928, The Boulder Canyon Project Act was passed by Congress which authorized the construction of Hoover Dam and Power Plant and the All-American Canal to Imperial and Coachella valleys. The Act also required that the District and other water users to enter into water delivery contracts with the Secretary of Interior. Finally, the Act authorized lower basin states to enter into a water apportionment agreement. The proposal was as follows: of the 7.5 MAF of water annually apportioned to the states, Nevada would receive 0.3 MAF, Arizona would receive 2.8 MAF, plus one-half of any excess water unapportioned by the Colorado River Compact, and California would receive 4.4 MAF, plus one-half of any excess water unapportioned by the Colorado River Compact.

The proposed apportionment was never settled upon by the Lower Basin States. In 1964, the United States Supreme Court Case of Arizona v. California (373 U.S. at 546) concluded that an agreement was not necessary because the Project Act authorized the Secretary of Interior to deliver water in accordance with the apportionment.

To complete the apportionment in California, the Secretary of Interior requested the State of California to prioritize water rights among the major water users. There were seven major water users which included the Palo Verde Irrigation District, the Yuma Project, the Imperial Irrigation District, the Coachella Valley Water District, the Metropolitan Water District, the City of San Diego, and the County of San Diego. On August 18 of 1931 the California Seven Party Agreement was signed by all the water users and went into effect. Table 8 shows the water apportionment priorities. Note that the first four California priorities total 4.4 MAF annually, of which the agricultural agencies are entitled to 3.85 MAF. As a result of the Colorado River Basin Project Act of September 30, 1968, the 4.4 MAF are also the quantities accorded priority over the Central Arizona Project.

After the California Seven Party Agreement, a draft contract for water delivery was

submitted to the District by the Secretary of Interior. The draft contract called for extension of boundaries of the Imperial Irrigation District to include the Coachella Valley. The Coachella Valley desired to maintain its own organization.

The District and the Secretary of Interior negotiated another contract which was approved by the District and the voters. Following approval, the District filed an action in the Supreme Court to validate the contract. The Coachella Valley objected to the validation. Following judgment in favor of the District and during Coachella Valleys' period of appeals, Imperial Valley and Coachella Valley negotiated in what came to be the Compromise Agreement of 1934. The result of this Agreement was that the District would have priority over Coachella in times of water shortage.

Table 8. Priority for Colorado River Water Established by the Seven Party Agreement for Water Apportionment

	Priority/User	Apportionment	
1.	Palo Verde Irrigation District (For use exclusively upon 104,500 acres of valley land in and adjoining district)		
2.	Yuma Project (For use on California Division, not exceeding 25,000 acres of land)		
3a.	Imperial Irrigation District and Coachella Valley Water District (Lands served by All-American Canal in Imperial and Coachella Valleys)	3.85 MAF	
3b.	Palo Verde Irrigation District (For use exclusively on an additional 16,000 acres of mesa lands)		4.4 MAF[2]
4.	Metropolitan Water District (For use on Southern California Coastal Plain)	0.55 MAF	
5a.	Metropolitan Water District (For use on Southern California Coastal Plain)	0.55 MAF	
5b.	City and County of San Diego[1]	0.112 MAF	0.962 MAF When Available
6a.	Imperial Irrigation District and Coachella Valley Water District	0.3 MAF	
6b.	Palo Verde Irrigation District (For 16,000 acres of mesa lands)		
	Total within California	**5.362 MAF**	

[1] Apportionment merged with those of MWD in 1946.
[2] Quantity is the Basic Entitlement for California.
Source: Water Conservation Plan, Imperial Irrigation District, 1985.

Table 9. City of El Centro Current and Projected Water Supplies (AF/Y)

Water Supply Sources	2005	2010	2015	2020	2025
Available raw surface water	35,755	35,755	35,755	35,755	35,755
Recycled Water	0	0	0	0	0
Total	35,755	35,755	35,755	35,755	35,755
Units of Measure: Acre-feet/Year					

Table 10. IID Current and Planned Annual Water Supplies						
Agency	**Water Supply Sources**	**2004**	**2010**	**2015**	**2020**	**2025**
Imperial Irrigation District (IID)	Colorado River Water Rights	2,948,500 AF[1]	2,733,800 AF[1]	2,564,800 AF[1]	2,645,300 AF[1]	2,607,800 AF[1]
Units of Measure: AF= Acre Feet						

1 See Table 4.0.1. Imperial Irrigation District's water right is not a defined volume but rather a quantity of water to serve a defined area of land.
2 Water Supply calculated using provisional water use data from *Diversions from Mainstream-Available Return Flow & Consumptive Use of Such Water Calendar Year 2000,* by U.S. Department of the interior Bureau of Reclamation Lower Colorado River Operations, March 7, 200 I, Provisional Water Use 2000.
3 Voluntary cap as per the proposed Quantification Settlement Agreement (QSA) for the Colorado River.

Reliability Planning

Law

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

10631 (c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable.

10631 (c) For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to replace that source with alternative sources or water demand management measures, to the extent practicable.

10631 (c) Provide data for each of the following:
(1) An average water year, (2) A single dry water year, (3) Multiple dry water years.

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

10632 (b) An estimate of the minimum water supply available during each of the next three-water years based on the driest three-year historic sequence for the agency's water supply.

Surface Water Quality

The surface waters of the Imperial Valley are quite different from what would be expected in a natural desert climate. The existence of most surface waters in the area is dependent primarily upon the inflow of irrigation water from the Colorado River via the All-American Canal. The use of this water for irrigation and other purposes has a significant effect on the quality of surface water.

There are three general categories which describe the surface water in Imperial County. These are freshwater, brackish water, and saline water. The freshwater (with TDS generally less than 1,000 ppm) include the All-American Canal and other

canals and laterals which deliver irrigation water to the agricultural fields within the County. The brackish waters (with TDS in the range of 2,000 to 4,000 ppm) include the Alamo River, New river and the agricultural drains that flow into these rivers or directly into the Salton Sea.

The Salton Sea represents the saline water category. Salinity concentrations are currently slightly higher than ocean water (the Salton Sea's current TDS is approximately 44,000 ppm). The surface waters in Imperial County thus pass through a salinity gradient from the Colorado River to the Salton Sea.

This regional salinity gradient exists because of the high evaporation of the Imperial Valley, high temperatures, low annual rainfall, and continual leaching of salts from irrigated areas. Evapotransporation is water transported and evaporated from plants and surrounding soil surfaces. Although water is continually evaporated from the major canals, this evaporation represents a relatively minor increase in dissolved solids concentration because of the short residence times within the water conveyance system.

High evaporation rates from the irrigated fields substantially reduce the amount of water and increase the concentration of salt entering the drainage system. A 300% to 500% increase in total dissolved solids concentration is normal within the valley as water moves from the All-American Canal to the New and Alamo Rivers.

The change in salinity through the valley is extremely important because it affects the aquatic ecosystems and other beneficial uses of the surface waters. However, salinity is not the only water quality issue. The intensive irrigation in the valley presents the potential for the introduction of agricultural chemicals, such as pesticides and herbicides, into downstream waters. Field erosion and dredging activities also result in siltation in the New and Alamo Rivers and the Salton Sea. The bacteriological quality of these waters is also a concern because these streams receive locally generated municipal waste discharges, in addition to the waste load

entering the United States from Mexico.

Groundwater Quality

The shallow aquifers beneath the Imperial Valley are affected by the inflow of Colorado River waters, the rate of evaporation, the depth of the agricultural tile drains beneath farm lands, and seepage from drains and rivers. The Colorado River is probably the most important source of recharge into shallow ground water aquifers; approximately ten percent percolated to underlying aquifers. Canals, such as the All-American and the East Highline, contribute to recharge because they are unlined; they are sometimes up to 200 feet wide; the All-American Canal flows across many miles of sandy terrain; and the water surface of the canals are higher than the general groundwater levels.

Drainage from agricultural fields has resulted in local high salinity because of the leaching of salts from these fields. In other areas, mounds of good quality fresh water have resulted from seepage from irrigation canals. This has occurred significantly in the unlined major canals and the All-American, East Highline, and Coachella canals.

Recharge by underflow from tributary areas is small compared to recharge that comes from the Colorado River. Direct recharge from rainfall is very minor; however on higher alluvial slopes of the southwestern mountains, precipitation can be sufficient for recharge by direct infiltration. This also occurs from runoff, mainly in washes and drainages which discharge to the central part of the valley and the Salton Sea.

Waters within the shallow aquifers of the Salton Trough generally move at right angles to contours lines, and towards the Salton Sea. Based on pumping data and water studies on various wells, groundwater is from six to eight feet below the ground surface level throughout most of the Imperial Valley. Shallow groundwater quality is best on the eastern and western sides of the County. Significant groundwater of good quality can also be found in the Ocotillo-Coyote Wells Groundwater Basin.

The deep water reservoir underlying Imperial Valley has been estimated at 1.1 billion to 3.0 billion acre feet, with total recoverable water estimated to be about twenty percent of the water in storage. Annual recharge is about 400,000 acre feet from various sources.

The deepest groundwater is in some cases is believed to be moderately altered ocean water. Above this level, the water may consist of residuals from prehistoric fresh water lakes that filled the Salton Trough. Waters at this level vary from low to moderate salinity. The next higher layers are high temperature, and in places highly saline waters.

In the central part of the Imperial Valley, the groundwater is of a higher salinity. Most wells had total dissolved solids concentrations of between 1,000 and 3,000 mg/L. The ionic composition of the water in the central part of the valley is similar to that of the East Mesa. However, as the total dissolved solids concentration increases, the ionic composition becomes more dominated by sodium chloride. The pH of these waters is usually slightly basic, with an occasional value less than seven.

In the western section of the valley, water quality varies widely. Almost all of the wells in Coyote Valley had total dissolved solids concentrations below 500 mg/L; however, West Mesa wells had levels between 1,800 and 5,200 mg/L.

Water Pollution

In order for an area to develop, it has to have sufficient resources. One of the most important and valuable resources is water. Water attracts people to develop where this resource is abundant and is put to beneficial use. However, not all water can be put to beneficial use if it is contaminated. A major problem with water quality that concerns many people is that of water pollution. There are a variety of issues that cause, or have potential to cause water pollution. In Imperial County, these issues include pesticide and fertilizer contamination of agricultural drains, geothermal developments, discharge from Mexico, and landfills in the County.

Agricultural Drains

Water pollution can be defined as any contamination of water that lessens its value to humans and nature. In the context of ecosystem function, pollution represents an imbalance of one or more elemental cycles. There are two broad classes of water pollution. One is point pollution which has its source in a well defined location, such as the pipe through which a factory discharges waste into a stream. The other is non-point pollution which has its source spread over large areas such as farms, grazing lands, construction sites, and the gardens, lawns, streets, and parking lots of cities.

There are two particularly disturbing aspects of groundwater pollution. One is that is can take years for some pollutants to move from the earth's surface into groundwater supplies. The other is that once the pollutants are in the ground, they can remain at problem concentrations for many decades. Studies performed by the Regional Board and U.S. Geological Survey indicate that drainage water in the Imperial Valley contains pesticides in quantities which often exceed the Environmental Protection Agency's criteria for protection of fish and wildlife. High levels of sediments and nutrients were also found.

For many years groundwater was assumed to be safe from chemical pollution because contaminant movement was thought to be restricted to the top few inches of

the earth's surface. During the late 1970's, scientists realized that certain kinds of pesticides, such as Dibromochloropropanes (DBCP), are capable of moving through the soil and mixing with groundwater. DBCP is a soil fumigant used to kill nematodes in the soil before planting a certain crop. In the Imperial Valley, the agricultural fields of lettuce, carrots, and tomatoes are sprayed with DBCP. There is potential for groundwater contamination from this process.

Water quality problems in drains have been attributed to discharge of irrigation surface runoff, such as tail water containing pesticide residues, fertilizers, and silt to receiving waters; drift of pesticides into adjacent waterways from aerial application; and mechanical dredging of drains, which in some reaches results in depletion of dissolved oxygen and suspension of chlorinated hydrocarbon pesticides.

Numerous governmental programs have been established to identify and correct existing pollution problems, as well as to prevent further groundwater contamination. Many of these programs are only a few years old and need to be continued for many years to be effective. If these programs are effective, water resources would be free of most pollutants detrimental not only to the environment but to the population as well.

Geothermal Developments

Extensive geothermal resources have been identified in several areas of the Imperial Valley. These are identified as Known Geothermal Resource Areas (KGRAs). Power plants are currently generating electricity from the hot water resources in the Salton Sea, the Heber KGRA, and the East Mesa KGRA. The fifteen existing power plants can generate about 300 megawatts, and it is estimated that the Imperial Valley resource could support approximately 2,750 megawatts of power production on a sustained basis.

Geothermal fluids in the largest and hottest field, the Salton Sea KGRA, contain about twenty-five percent dissolved solids by weight. These fluids also contain

marginally hazardous levels of arsenic, antimony, lead, mercury, zinc, and a large amount of other potential pollutants, including ammonia, boron, copper, lithium, selenium, strontium, and manganese.

The Heber and East Mesa KGRAs have fluids that are much cleaner by comparison, and contain less than two percent dissolved solids. Drilling has identified additional potential resources in the El Centro, Westmorland, and Salton City areas.

Geothermal power plants extract hot water through large wells drilled from 2,000 to 12,000 feet below the surface. The hot water is either allowed to boil to produce stream or passed through heat exchangers. Return flows of hot water from both processes are injected back into the geothermal reservoirs through separate wells. The problems of contaminating the surface waters or nearby non-geothermal ground waters exists if the return flows are not injected to a significant depth; if they are injected under too much pressure; if they are injected into faults or fractures than connect to the surface; or if the injection wells leak. The potential for surface spills exists from pipeline failures or well blowouts.

In addition, land subsidence is a potential effect of geothermal developments. Currently, most of the extracted fluid is returned to the reservoir by injection, with the remainder being vented to the atmosphere as steam. This problem can be expected to increase as more power plants are built, although the natural subsidence of the Imperial Valley occurs at a rate of about one inch in ten years.

Discharges from Mexico

Mexico is probably the largest contributing factor to increasing water pollution in the Imperial Valley via the New River. The New River originates in Mexico, and flows northward across the International Boundary into Imperial County, California. The flow continues through the Imperial Valley and ultimately discharges into the Salton Sea. The primary purpose of the New River is to convey agricultural drainage in the Imperial and Mexicali valleys to the Salton Sea. A corollary use of the New River is to

convey treated community and industrial wastewaters. This corollary use is strictly controlled in the Imperial Valley by waste discharge requirements prescribed and enforced by the California Regional Water Quality Control Board. However, Mexico's corollary use of the New River is largely ignored and uncontrolled.

Mexico discharges raw and inadequately treated sewage, toxic industrial wastes, garbage and other solid wastes, animal wastes, and geothermal wastewaters out of the Mexicali area of Mexico and into the Imperial Valley. This process has continued for over forty years, resulting in the on-going pollution of the New River at the International Boundary. As Mexico's industry and population continue to grow, these problems have a high potential to increase if corrective measures are not taken.

Until August of 1983, the problem of Mexico polluting the New River had been the responsibility of United States Section of the International Boundary and Water Commission (IBWC), a joint United States/Mexico federal agency with responsibility for dealing with border water and sanitation problems between the two nations.

For over thirty years, the California Regional Water Quality Control Board has made several representations to the United States Commissioner on the IBWC to obtain corrections to the problem. Since 1975, the California Regional Water Quality Control Board has been monitoring water pollution of the New River to identify the pollutants actually coming from Mexico. This information has been presented to the United States Commissioner to aid and encourage Mexico in implementing corrective measures.

In August of 1980, Minute No. 264 to the Mexico-American Water Treaty was signed, which specified time schedules for completing work that was to result in a full cleanup of the river. In addition, minimum water quality standards were specified for New River water quality at the International Boundary. Mexico has been in violation of practically all of the specified schedules and standards since Minute No. 264 went into effect in December of 1980. There is no evidence that Minute No. 264 has had

any influence on actions in Mexico to clean up the river.

In July of 1983, the California Regional Water Quality Control Board conducted an investigation. The purpose of the investigation was to determine the type(s) and extent of waste discharges into the New River and its tributaries from Mexico so that possible corrective action could be considered and pursued. The investigation identified problems that must be addressed to obtain adequate corrections. These problems included:

1. City sewer lines which are not connected to the City's main sewer system discharging raw sewage to the river;

2. Breakdowns in the sewer system resulting in the discharge of raw sewage to the river;

3. Discharge of wastes to the river by septic tank pumpers;

4. Discharge of wastes to the river from adjacent unsewered residences;

5. Discharge of untreated industrial wastes to the river including highly toxic chemicals wastes, many of which are on the Environmental Protection Agency's list of 129 priority pollutants and some of which are carcinogens;

6. Inadequate treatment of sewage and industrial wastes by Mexicali, whose sewage treatment plant consists of nothing more than raw sewage lagoons;

7. Location of the City's garbage dump such that refuse is disposed of directly into the river water;

8. Discharges of untreated wastes from a slaughterhouse, dairy, and hog farms;

9. Discharges from residential hog and cattle pens located adjacent to the river and its tributaries; and

10. Discharge of geothermal wastes to the river.

In August of 1983, a United States/Mexican Agreement for protection and improvement of the environment in the border area was signed by the Presidents of Mexico and the United States. Under this agreement, responsibility for border environmental problems, including the New River pollution problem, was transferred from the International Boundary and Water Commission to the United States Environmental Protection Agency for the United States, and to the Mexican Secretarial de Desarollo Urbano y Ecologia (SDUE) for Mexico. Since this transfer of responsibility, progress has been slow and it is questionable if the agreement has served any useful purpose in controlling pollution in the New River.

In April of 1987, Minute No. 274 to the Mexican-American Water Treaty was approved by the United States and Mexico. The minute provided for a $1.2 million United States/Mexico jointly funded project to construct certain works in Mexico to reduce pollution in the New River. Although this project is just a step towards resolving the pollution problems of the New River, it sets a precedent for the involvement of the United States in the implementation of corrective actions within Mexicali.

According to the International Boundary and Water Commission of the United States, additional projects are needed to help reduce water pollution from Mexico. Mexico and the United States are currently negotiating measures to solve the problem. Upon agreement between both governments, a new Minute will be approved and added to the Mexican-American Treaty to supersede Minute No. 274. The main goal of the new Minute would be to establish a long-term solution to the water pollution problem.

Aside from the New River, the Alamo River is polluted with contaminants as well. The

Alamo River flows into Imperial County from Mexico and has low pollutant concentrations. Presently, the Alamo River is very small as it crosses into the United States and carries agricultural water coming from agricultural fields in Mexico. The main pollutants in the water are pesticides which get drained into the Alamo River during irrigation. However, the potential for polluting the Alamo River could increase not only from the pesticides contained in the water but from potential development at or near the Alamo River at the International Boundary. A new border crossing has been constructed at or near the Alamo River as it crosses into the United States. This new border crossing could create an "urban sprawl" effect in this area of Imperial County, which would increase drainage into the Alamo River. The Alamo River currently has a small concrete culvert that passes underneath the All-American Canal which drains water coming from Mexico and eventually into the Salton Sea. Additional flows could clog the culvert and present a financial burden to Imperial County and lead to environmental health problems.

An option proposed by the California Regional Water Quality Control Board has been to shunt the Alamo River into a drainage system which would eventually drain into the New River before it crosses into the United States. In order for this to happen, both governments must agree. Presently, nothing has been settled but further negotiations are currently being reviewed between the United States and Mexico, in hopes to minimize potential problems that could result from the development of the new border crossing.

Landfills

Another potential problem that may contribute to the pollution or contamination of groundwater is landfills. There are three different types of landfills within the County. These are classified as Class I, Class II, and Class III. A Class I landfill site is for the sole purpose of dumping hazardous wastes, a Class II landfill site is for dumping designated and/or special waste, and a Class III landfill site is for dumping non-hazardous wastes such as municipal waste.

Currently there are ten County-operated Class III disposal sites throughout Imperial County which accept non-hazardous wastes (Figure 3). Four of the County landfills, near El Centro, Hot Mineral Spa, Imperial, and Calexico, are under the ownership or control of the County; five, Holtville, Niland, Salton City, Ocotillo, and Palo Verde, are on Bureau of Land Management (BLM) property; and one, the Picacho landfill, serves the Winterhaven/Bard area and is located on land owned by the Quechan Indian Reservation.

In addition to the public sites, Imperial Republic Acquisitions operates a private Class III waste disposal facility in the unincorporated area northwest of the City of Imperial; Laidlaw Environmental Services operates a Class I facility west of the City of Westmorland; and Desert Valley Company operates a Class II solid waste disposal/storage site northwest of the City of Westmorland.

For more detailed information on solid and hazardous waste disposal sites, please refer to the Health Department, Imperial County Hazardous Waste Management Plan. The Imperial County Integrated Waste Management Plan is being prepared by the Department of Public Works, with a draft to be presented to the State Integrated Waste Management Board in January 1994.

Reliability

Reliability is a measure of a water service system's expected success in managing water shortages. To plan for long-term water supply reliability, planners examine an increasingly wide array of supply augmentation and demand reduction options to determine the best courses of action for meeting water service needs. Such options are generally evaluated using the water service reliability planning approach.

In addition to climate, other factors that can cause water supply shortages are water pollution, earthquakes and energy outages at the treatment and pumping facilities.

Reliability planning requires information about: (1) the expected frequency and severity of shortages; (2) how additional water management measures are likely to affect the frequency and severity of shortages; (3) how available contingency measures can reduce the impact of shortages when they occur.

Past Drought, Water Demand, and Conservation Information

California experienced a prolonged drought from 1987 through 1992. However, because the City uses reliable Colorado River water, the drought did not affect the City's water supply.

The City receives water from the All American and Central Main Canals. If either the All American Canal or Central Main Canal were shut down, water could not be delivered to the treatment plant. The shut down could be for scheduled maintenance or as a result of an emergency, such as an earthquake. In October 1979, an earthquake caused levee and slope failures along the All American Canal east of El Centro, severely limiting water flow. This is the only time during the last 25 years that the All American Canal was shut down.

Maintenance is scheduled to be performed monthly on the Date Canal and Dahlia Lateral. Typically, however, the Date Canal and the Dahlia Lateral are shut down about three times annually, usually lasting approximately three days each time. The Central Main Canal and the All American Canal are seldom shut down. To perform maintenance on the Central Main Canal, the water level is lowered but service is not completely interrupted. According to plant operators, this is done every five to ten years.

Frequency and Magnitude of Supply Deficiencies

Regional and State Drought Conditions

Imperial Irrigation District's present perfected and contract water rights are highly unlikely to be affected by the usual state and regional drought conditions. The water of the Colorado River is used by both the Upper Basin States (Colorado, New Mexico, Utah, and Wyoming) and the lower basin states (Arizona, California and Nevada), as well as by Mexico. Assuming drought conditions on the Colorado River, California's 4.4 million acre-feet water apportionment is not likely to be impacted due to the massive storage quantities in the Colorado River reservoir system and the structure of water priorities. Arizona's Central Arizona Project must reduce its water diversions by one million acre-feet before any other lower basin water entitlement is affected. Additionally, Imperial Irrigation District's 2.6 million acre-feet of present perfected water rights theoretically protect its water users unless changed by future legislative action.

Imperial Irrigation District holds legal titles to all its water and water rights in trust for landowners within its service area (California Water Code §§20529 and 22437; Bryant v. Yellen, 447 U.S. 352, 371 (1980), fn.23.). While groundwater in the Imperial Unit is not used for commercial or major sources of water due to the high salt content, Imperial Irrigation District's Colorado River water supply is consistent and reliable.

The selected average or normal water year for this report is 1995 as it was the median water use year from 1994 through 1998. For the purposes of this plan, the "single dry water year" term is changed to "single reduced demand water year" as Imperial Irrigation District's senior water rights are such that drought conditions have never impacted its water supply. Thus for the purpose of this plan, 1992 was selected as the "single reduced demand water year" as this year had the lowest Imperial Irrigation District water usage during the 1989 to 1998 time period. In 1992, Imperial Irrigation District's available water supply was calculated to be 3,463,992 acre feet.

As illustrated in Table 4.0.1, Imperial Irrigation District does not have a quantified water right but instead is allotted the right to use flows within a 3.85 million acre-feet agricultural entitlement. Four agencies share this entitlement, and the right to use these flows is prioritized with the highest priority waster user diverting flows first, followed in order of priority by the other three agricultural entities. Thus, Imperial Irrigation District's third priority water right gives it the right to use whatever flows it can put to reasonable and beneficial use after diversions by the Palo Verde Irrigation District and Yuma Project Reservation Division. Coachella Valley Water District holds the last priority to this agricultural entitlement, and is legally entitled to use whatever flows remain from the 3.85 million acre-feet allotment that have not already been diverted by the first three priority holders. Thus, in any year each of the agricultural water users' available water supplies can be determined by subtracting the annual diversions of the higher priority water users From the 3.85 million acre-feet agricultural entitlement. In 1992 Imperial Irrigation District's available water supply was calculated by subtracting Palo Verde Irrigation District and Yuma Project Reservation Division diversions (386,008 acre-feet cumulatively) from the 3.85 million acre-feet entitlement, for a 3,463,992 acre-foot supply. However, Imperial Irrigation District's 1992 consumptive use was only 2,572,659 acre-feet so the remaining 1,277,341 acre-feet of flows would have been available for Coachella Valley Water District and lower priority Colorado River contractors.

The Imperial Irrigation District's lowest water use years during the 1989 through 1998 time period, were 1991 and 1992 with 1992 being lower than 1991. The term "multiple

dry water years" is changed to "multiple reduced demand water years." Historically, the most recent California drought period was from 1987 to 1992. For the ten year period from 1989 through 1998, the Imperial Irrigation District's lowest water use years were 1991, 1992, and 1993. See Table 4.4.1.

Table 11. IID Annual Water Supply Reliability					
			Multiple Reduced Demand Water Years		
	Average/Normal Water Year (1995)	Single Reduced Demand Water Year (1992)	Year 1 (1991)	Year 2 (1992)	Year 3 (1993)
Water Use	3,070,582	2,572,659	2,898,963	2,572,659	2,772,148
Water Supply	3,373 233	3,463,992	3,375,173	3,463,992	3,457,909
Unit of Measure is Acre-Feet					

Decree accounting consumptive use from the *Compilation of Records in Accordance with Article V of/he Decree of the Supreme Court of the United States in Arizona v. California Dated March* 9,1964 Calendar Years 1991, 1992, 1993, and 1995, by the U.S. Department of the Interior Bureau of Reclamation Lower Colorado Region.
2 Water Supply calculated using data from the *Compilation of Records in Accordance with Article V of the Decree of the Supreme Court of the United Stales in Arizona v. California Dated March* 9, *1964* Calendar Years 1991, 1992, 1993, and 1995 by the U.S. Department of the Interior Bureau of Reclamation Lower Colorado Region.

For the purposes of this report and compliance with the Urban Water Management Planning Act, three years were selected to estimate a minimum annual water supply. The selected three years are 2001, 2002, and 2003. If during the years 2001, 2002, and 2003 there were a minimum water volume supply From the Colorado River, it would be 3.1 million acre-feet according to a voluntary self imposed cap proposed in the QSA.

Plans to Assure a Reliable Water Supply

Water Distribution Facilities

An extensive pipeline network supplies water to the City's customers at a normal operating pressure of 60 psi. Much of the distribution network is relatively new because of the population increase and the corresponding housing developments occurred in the last few decades. Also, the location of the water treatment plant changed in the mid-1950's creating new location requirements for the principal water lines.

A 30-inch pipe transports water from the treatment facility. If the pipe were to be out of service, however, the only source of treated water would be the remote 5.0 MG

storage tank on La Brucherie Road. Assuming the maximum velocity of 10 fps (see Table 2.4.1), the capacity of the 30-inch pipeline from the treatment plant is 22,000 gpm (31.7 mgd).

Two water transmission pipelines extend from the 30-inch pipe in front of the water treatment plant. These pipelines carry water to the entire city. One 18-inch pipeline runs west from the treatment plant and then north along Imperial Avenue. At Hamilton Avenue, it continues west for one half mile until La Brucherie Road. There, it turns north and continues for several miles with several 12-inch lines branching from it.

The pipeline that heads north from the treatment facility is 30 inches in diameter. It flows north from the treatment plant along 8th Street until it reaches Driftwood Drive. There, it splits into one18-inch diameter main and one 24-inch diameter main. The 18-inch main flows east along Driftwood Road and provides service to the eastern and northeastern portions of the city. The 24-inch main flows north to Hamilton Avenue and provides water to the north part of the city.

Water Storage Facilities

The City of El Centro has both raw and treated water storage facilities in case of emergency water supply reduction. Raw water from the All American Canal via the Date Canal and the Dahlia Lateral Number 1 is first stored in one of two asphalt lined reservoirs located on the treatment facility premises. Each reservoir has a nominal storage capacity of 30 million gallons (MG) for a total of 60 MG of untreated water.

The two raw water reservoirs are located on the western side of the plant site and are original to the facility. Both are 512 wide and 652 feet long with a depth of 14 feet. The earthen dikes that form the sides of the reservoirs have side slopes of 2-horizontal to 1-vertical (2:1). The reservoir bottom and interior side slopes are paved with three-inch asphaltic concrete lining. Water from the Date Canal flows west via a 42-inch concrete pipe to the raw water pumping structure adjacent to the reservoirs. Water received from the Dahlia Lateral enters the treatment site from the north end of

the property in 18-inch and 24-inch concrete pipes that carry the water to the same pumping structure.

Water can be pumped to either of the storage reservoirs from the raw water pump structure. A 36-inch concrete pipe leads from the structure to the north reservoir and a 48-inch concrete pipe extends to the south reservoir. A 48-inch concrete pipe connects the two ponds. From the reservoir, the water enters the treatment system through distribution chamber via two concrete pipes, one from each reservoir. A 48-inch pipeline and 36-inch pipeline lead from the north and south reservoirs, respectively.

The treatment plant has a normal flow pattern for the storage ponds. Water is pumped into the south pond, flows by gravity to the north pond, and then continues by gravity flow to the clarifiers. This configuration utilizes the largest pipes and has adequate retention time for sedimentation of silt carried in the raw water.

An overflow pipe is located on the north wall of the north reservoir. It drains to an irrigation ditch north of the plant. The south pond overflows into the north pond, above the 48-inch circulation pipe. The overflow outlets prevent overtopping of the reservoirs where erosion of the reservoir embankments could undermine the structural integrity of the side slopes and cause massive spilling. Shutting down the inflow pump station could also prevent a major overflow.

After undergoing treatment, the water is stored in several treated water tanks. Three tanks are located at the treatment facility and another is at the corner of La Brucherie Road and Barbara Worth Avenue. The total treated water storage is 15.0 MG. At the treatment facility, two tanks were installed with the original construction of the facility in 1956 and have a capacity of 2.5 MG each. In 1977, an additional treated water storage tank was placed on the site with a capacity of 5.0 MG, thereby doubling the amount of storage to 10.0 MG. The latest water storage capacity addition was the 1993 installation of a 5.0 MG tank at the corner of La Brucherie Road and Barbara Worth Avenue, located approximately 2 miles northwest of the treatment facility. In

total, 75 million gallons of water can be stored if all the reservoirs and tanks were full simultaneously (see Table 2.6.4 A below).

Table 2.6.4 A Total Water Storage Capacity

Type of Storage	Location	Type of Reservoir	Capacity (MG)	Year Constructed
Raw Water Storage				
Pond 1	Treatment Plant	Asphalt Lined Pond	26.25	1956
Pond 2	Treatment Plant	Asphalt Lined Pond	26.25	1956
Total Raw Water Storage			52.5	
Treated Water Storage				
Reservoir Tank #1	Treatment Plant	Welded Steel Tank	2.5	1956
Reservoir Tank #2	Treatment Plant	Welded Steel Tank	2.5	1956
Reservoir Tank #3	Treatment Plant	Welded Steel Tank	5.0	1977
Remote Reservoir	La Brucherie and Barbara Worth	Welded Steel Tank	5.0	1993
Total Treated Water Storage			15.0	
Total Water Storage			67.5	

The two 2.5 MG tanks at the treatment facility receive treated water directly from the filter clearwell pump station via 30-inch and 24-inch reinforced concrete pipes (RCP). Water enters the tanks approximately six feet above the bottom. The 30-inch pipe splits at a “T” between the two tanks into two 24-inch concrete pipes leading directly into the tanks.

The 5.0 MG storage tank, which was constructed in 1977, similarly receives treated water from the filter clearwell pumps via a 30-inch RCP and 36-inch asbestos cement pipe (ACP). The roof of the tank is 24 feet above the ground. The tank has a diameter of 197’ 6”. Flow to the tank passes through a 30-inch butterfly valve. Water

enters the tank three feet above the bottom in the northeast section of the tank through a 36-inch diameter inlet. The outlet is located 78 feet from the inlet and 3' 5" above the bottom. The outlet is located on the north side of the tank. Water exits the tank through a 30-inch outlet and flows to the booster pumps through a 30-inch ACP and 24-inch butterfly valve.

Water flows to the plant's booster pump station through 24-inch and 30-inch concrete pipes. At the main pumping room, the water is pressurized to the distribution system's normal operating pressure of 60 psi. Overflow from the 2.5 MG reservoirs flows through an 18-inch concrete pipe that leads west to the backwash pond. Like the others, this tank also overflows to the backwash pond. Overflow exits the tank on the northwest side through a 24-inch RCP and flows by gravity to the southeast corner of the backwash pond.

Water in the La Brucherie tank is pumped from the storage tank into the distribution system to meet peak water demands during the mornings and evenings. During the three-hour periods, 2,500 gpm is pumped into the system. The morning and afternoon releases generally start at 7 a.m. and 5:30 p.m., respectively. The tank is replenished during minimal consumption times, usually in the early afternoon and early morning. For this to happen, three criteria must be met. First, the pumps must not be pumping into the distribution system. The water level in the tank must be less than 38' above the ground (40' tank). And finally, the system pressure must be greater than 55.4 psi.

Water from the La Brucherie storage site can also release water outside of its normal schedule. Water is pumped into the distribution system when the system pressure falls below 54-psi for more than 180 consecutive seconds. The secondary pump will begin pumping when the system pressure falls below 53-psi. This remote facility allows the system to meet varying water demands with more consistent water pressure throughout the city than with water pumped only at the treatment plant. It also allows better utilization of existing infrastructure capacity.

Two existing elevated treated water storage tanks are no longer in service. One tank

at the corner of 3rd and Commercial Streets was constructed in 1908 and has a capacity of 0.1 MG. The other, located at 8th and Vine Street, has a capacity of 0.25 MG and was constructed in 1926. The purpose of these tanks was to maintain adequate water pressure throughout the distribution system. When the system converted to a completely pumped system with a normal operating pressure of 60 psi in 1993, the elevated tanks ceased to be used. Both tanks have a height of approximately 100 feet, which, when full, would only provide a pressure of 43 psi to the system. Because these tanks are no longer utilized, they have not been included in the storage capacity calculations. Because of their removal costs, they have remained abandoned in place.

Imperial Irrigation District Reliability

Under a worst case water supply scenario the Imperial Irrigation District is confident that urban water users (which comprise less than two percent of its annual water deliveries) can be assured delivery of their required water supply. Due to its present perfected water rights and the relatively small water demand of non-agricultural water users, the Imperial Irrigation District would not reduce or cut back urban water deliveries even in years of reduced deliveries. Since its inception in 1911, the Imperial Irrigation District has never been denied the right to divert the amount of water it has requested for agricultural purposes and other beneficial uses.

Three Year Minimum Water Supply

The City forecasts no supply shortage at any point in the future.

Imperial Irrigation District Supply

It is unlikely that the urban water supply of Imperial Irrigation District would ever be affected, even under shortage or drought conditions on the Colorado River. Urban water use in the Imperial Unit makes up less than two percent of the total water delivered by the Imperial Irrigation District. Under a worst case water supply scenario,

the Imperial Irrigation District is confident it can meet the demands of urban water users.

Due to the high quality of the Imperial Irrigation District's water rights, Colorado River flows, and the storage facilities on the Colorado River it is highly unlikely that Imperial Irrigation District's water supply will be affected, even in dry years. See Water Supply Section, pages 15 through 20, for water right details. The entire southern California region, both urban and agricultural, would be in a severe drought emergency before the Imperial Valley's water supply is threatened. Historically, the Imperial Irrigation District has never been denied the right to divert the amount of water it has requested for agricultural irrigation and other beneficial uses.

In the event that there is a water shortage in the Lower Colorado River Basin, the Imperial Irrigation District/San Diego County Water Authority water transfer agreement states that both agencies will share, on a pro-rata basis, any reductions in water to Imperial Irrigation District should a shortage declaration by the Secretary of the Interior for the Lower Colorado River Basin affect the Imperial Irrigation District's water conservation and transfer programs. When the amount of water in usable storage in Lake Mead is less than 15 million acre-feet and the unregulated inflow into Lake Powell is forecasted to be less than 8.8 million acre-feet, the Imperial Irrigation District and the San Diego County Water Authority have agreed to meet and confer to discuss a supplemental water transfer agreement in anticipation of the shortage.

Should operating conditions on the Colorado River indicate Imperial Irrigation District may be impacted by reductions in water deliveries, the Imperial Irrigation District will notify all of its water users by mail and will conduct an educational outreach program in conjunction with the local media and municipal water systems. The notice will request all water suppliers, and in particular residential, industrial, and commercial water users, to conserve water on a voluntary basis. Urban water suppliers will be responsible for notifying their customers and implementing their own voluntary water conservation measures and programs.

Urban water supply reductions in the Imperial Unit are not likely to occur during the next twenty years. Action stages are noted in this plan in order to comply with California's Urban Water Management Planning Act requirements and have not been approved by any of the agencies participating in this plan. Urban water supply shortage stage one is voluntary, has cut back conditions of less than 15 percent, and is estimated to provide up to 79 percent of the reduction goal for urban water suppliers. Urban water supply shortage stage two is voluntary, has cut back conditions of 15 percent to less than 25 percent, and is estimated to provide 7 to 12 percent of the reduction goal for urban water suppliers. Urban water supply shortage stage 3 is mandatory, has cut back conditions of 25 percent to less than 35 percent, and is estimated to provide the remainder of any reduction goals for urban water suppliers. Mandatory provisions to reduce individual urban consumer water use are beyond the jurisdiction of the Imperial Irrigation District. Any urban water use reductions or restrictions are the responsibility of individual urban water suppliers who treat and distribute water within the Imperial Unit. This includes Water Shortage Emergency Response Emergency actions and procedures to be taken by Imperial Irrigation District Water Department staff during an emergency or time of disaster are described in the Emergency Preparedness Plan.

Transfer or Exchange Opportunities

Law

> 10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
>
> 10631 (d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

Quantification Settlement Agreement (QSA)

Taking the initiative to resolve a number disputes, at the end of 1999 the Boards of Directors of the Imperial Irrigation District, Coachella Valley Water District (CVWD), and MWD approved the Key Terms for Quantification Settlement among the State of California, Imperial Irrigation District, Coachella Irrigation District, and Metropolitan Water District of Southern California as the basis for obtaining public input regarding Colorado River water use in California. From this input and subsequent negotiations, the parties drafted a series of legal agreements that together comprised the basis for reallocating a portion of Colorado River water and implementing certain practices during a quantification period of 45, and up to 75, years. The Quantification Settlement Agreement (QSA) is designed to resolve differences among Colorado River contractors regarding water allocations, enhance the reliability of Colorado River supplies to each of the participating agencies, and provide part of the mechanism for California to limit its consumptive use of Colorado River water to its 4.4 million acre-feet (MAF) annual apportionment.

Throughout 2001, 2002 and most of 2003, the Imperial Irrigation District, CVWD, and MWD engaged in QSA negotiations with the State of California and the US Bureau of Reclamation. On October 10, 2003, the Colorado River Water Delivery Agreement (Federal Agreement) was signed by the US Secretary of the Interior, the CVWD, Imperial Irrigation District, MWD and SDCWA. On that date, the QSA and Related Agreements were also signed by the US Secretary of the Interior and/or representatives of various Indian tribes, the US Bureau of Reclamation, SDCWA,

CVWD, MWD, and the Imperial Irrigation District.

The QSA and Federal Agreement (Agreements), which generally extend for a 45-year period with provisions to extend up to 75 years (through 2047, or to 2077), consist of a series of water transfers, water exchanges, water conservation measures, and other changes affecting the water budgets of Imperial Irrigation District, CVWD, MWD, San Luis Rey Indian Settlements, and various Indian PPRs. The key water conservation components of the QSA are the concrete lining of portions of the Coachella and All-American Canal, and the Imperial Irrigation District water conservation and transfer program.

Imperial Irrigation District Water Conservation and Transfer Program

Under the terms of the QSA, Imperial Irrigation District's water rights remain unchanged; however, to mitigate impacts to the Salton Sea, instead of a strategy that was to be based solely on conservation, Imperial Irrigation District was required to implement a fallowing program for the agreement's first 15 years. By year fifteen and through the duration of the transfer, system improvements such as canal interceptors, mid-lateral reservoirs, and automation along with on-farm improvements such as tailwater recovery systems and micro-irrigation are expected to provide the water needed for the transfer.

In 1989, the Imperial Irrigation District entered into a water conservation and transfer agreement with Metropolitan Water District of Southern California (MWD). The Imperial Irrigation District/Metropolitan Water District of Southern California Water Conservation Agreement (IID/MWD Water Conservation Agreement) now conserves approximately 108,500 acre-feet of water annually. The conserved water is transferred to MWD and its urban water users in Los Angeles, San Diego, and the surrounding areas in southern California. In 1997, the Imperial Irrigation District and the San Diego County Water Authority (SDCWA) entered into a long-term conservation and water transfer agreement, which, if implemented, will benefit all Californians. The Imperial Irrigation District/San Diego County Water Authority Water

Conservation and Transfer Agreement provides for the transfer to SDCWA of up to 200,000 acre-feet per year of water conserved within the Imperial Irrigation District service area, plus an additional optional amount of up to 100,000 acre-feet per year.

Under this agreement, the Imperial Irrigation District and its agricultural water users will conserve water and transfer the quantity conserved to SDCWA for at least 45 years. Either agency may extend the contract for another 30 years beyond the initial term. Deliveries in the first year of program implementation will total 20,000 acre-feet and increase in 20,000 acre-feet increments annually for a minimum 130,000 acre-feet transfer or up to a maximum 200,000 acre feet transfer. SDCWA would pay an amount for the water that equals the cost of conserving the water plus an incentive to encourage participation by farmers, along with an index to adjust the cost of the water in future years based on market prices. Additionally, the water must result from 'extraordinary conservation,' not land fallowing (which is contractually prohibited as a method of conservation).

Implementation of the Imperial Irrigation District/San Diego County Water Authority water conservation and transfer is contingent upon several factors, such as the satisfactory completion of 'wheeling' (transportation and/or exchange) arrangements between San Diego County Water Authority and Metropolitan Water District of Southern California, the completion and certification of all required environmental documents, issuance of an necessary permits and approvals by state and federal authorities, environmental mitigation costs that do not exceed predefined caps outlined in the transfer agreement, and adequate farmer participation levels to ensure that at least 130,000 acre-feet of the conserved water is generated by on-farm conservation efforts. The balance of the 200,000 acre feet can be made up with Imperial Irrigation District system improvements.

In 1999 the Boards of Directors of the Imperial Irrigation District, Coachella Valley Water District, and Metropolitan Water District of Southern California approved the *Key Terms for Quantification Settlement among the State of California, Imperial*

Irrigation District, Coachella Irrigation District, and Metropolitan Water District of Southern California as the basis for obtaining public input regarding a Quantification Settlement Agreement (QSA). From this input and negotiations the QSA parties are drafting a series of legal agreements that together will comprise a QSA. In general, the QSA is a proposed agreement to reallocate a portion of Colorado River water and implement certain practices during the quantification period (which could last from 35 to 75 years) as a means of resolving differences among Colorado River contractors regarding water allocations. The QSA is designed to enhance the reliability of Colorado River supplies to each of the participating agencies and provide part of the mechanism for California to limit its diversions of Colorado River water to its 4.4 million acre-feet per year apportionment. The QSA includes provisions that would:

1. Voluntarily limit the share of Colorado River water that may be diverted and put to beneficial use by Coachella Valley Water District and Imperial Irrigation District.
2. Facilitate various conservation and transfer agreements.
3. Modify existing conservation agreements to fit within the terms of the QSA.
4. Establish other conditions that must be in place before the approval of the QSA.

The quantification of agency specific diversion rights and implementation of voluntary conservation measures and water transfers/exchanges by participating agencies would result in the annual, collective transfer of water from agricultural uses, principally in the Imperial Irrigation District service area, to other participating agencies. Water conservation would be achieved through a variety of means, including on-farm and system improvement measures within the Imperial Irrigation District service area and main canal linings.

Under the QSA, Imperial Irrigation District would agree to limit its Priority 3a diversion of Colorado River water to 3.1 million acre-feet per year. This consensual limitation constitutes a forbearance of Imperial Irrigation District's right to divert, for beneficial

use, up to the entire balance (after Priorities 1 and 2) of the 3.85 million acre-feet per year amount allocated in the aggregate to Priorities 1, 2, and 3. This forbearance increases the certainty of water availability to agencies with lower priorities. Water conserved within Imperil Irrigation District's service area would be available for use by Coachella Valley Water District, Metropolitan Water District of Southern California, or San Diego County Water Authority. If the QSA is approved and implemented, portions of the Imperial Irrigation District/ Metropolitan Water District of Southern California and Imperial Irrigation District/San Diego County Water Authority water conservation and transfer agreements would be modified to reflect changes in diversion point and recipient of some of the conserved water, but the cumulative total volumes of the transfers would not be affected.

Water Use Provisions

Law

> 10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
>
> 10631 (e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:
>
> (A) Single-family residential; (B) Multifamily; (C) Commercial; (D) Industrial; (E) Institutional and governmental; (F) Landscape; (G) Sales to other agencies; (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof; and (I) Agricultural.
>
> (2) The water use projections shall be in the same 5-year increments to 20 years or as far as data is available.

Past, Current and Projected Water Use

Table 7 illustrates Past, Current, and Projected Water Use 2000 – 2025 in acre-feet per year, and Table 6 illustrates Past, Current, and Projected Water Use 2000 - 2025 in number of customers per year. Population increases in the City of El Centro for the years between 2005 and 2025 are estimated by SCAG to be 1.1% compounded annually. The population projections stem from incoming development and industry to the City of El Centro. The number of connections is estimated to increase by 1.1% per year per the population projections.

The City's water service records indicate that in December 2000 there were 8,687 metered connections in the city. 7,415 were for residential, 254 were for multi-family 816 were for commercial customers, 15 for industrial, 48 for landscaping, and 3 for agricultural accounts. There are non-metered customers, mostly municipal services for park irrigation and administration buildings. Fire hydrants are located throughout the city and use the treated water distribution system as the source of pressurized water.

Table 12. Current and Projected Number of Connections by Customer Type – City of El Centro						
Customer Type	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**
Single family res.	7,415	7,833	12,995	13,965	14,825	15,754
Multi-family residential	254	268	538	595	720	782
Commercial/Institutional	816	862	911	962	1,016	1,073
Industrial	15	16	17	18	19	20
Landscape Irrigation	48	51	54	57	60	63
Agricultural Irrigation	3	3	3	4	4	4
Other	136	144	152	160	169	179
El Centro Total	**8,687**	**9,177**	**14,670**	**15,761**	**16,813**	**17,875**

Table 13. Estimated Past, Current and Projected Annual Water Use – City of El Centro						
Water Use Sectors	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**
Single family residential	1,651	1,744	1,842	1,946	2,056	2,172
Multi-family residential	326	344	364	384	406	429
Commercial/Institutional	525	555	586	619	654	691
Industrial	38	40	42	45	47	50
Landscape Irrigation	51	54	57	60	64	67
Other	248	262	277	292	309	326
El Centro Metered Total Million Gallons (MG)	2,737	2,839	2,999	3,168	3,347	3,535
Total El Centro Water Pumped into system (MG)	2,864	2,932	3,079	3,221	3,390	3,571
Total Un-metered Flows and system losses (MG)	127	93	80	53	43	36
El Centro Total Flows (**Acre Feet**)	**8,878**	**9,089**	**9,544**	**9,985**	**10,509**	**11,070**

The existing City's water billing system identifies customers' categories, so that accounts can be classified by use class and can identify each customer by sector and usage category. The total amount of water delivered into the system, the El Centro Total, is metered at the water treatment plant and is shown in Table 13. Un-metered

flows include park irrigation and system losses. It is anticipated that the un-metered flows will decrease over time, as the City plans to install meters at all park locations. Currently un-metered flows and system losses account for approximately 4% of the total flows. It is anticipated that this will be reduced to 1% over the next 20 years. The increase in flows from 2000 to 2005 was 5.6% over the five year period. The flows were projected to increase by the same amount every five years over the next 20 year period.

Table 14. Year 2005 Water Usage

Parameter	MGD	GPM
Annual Daily Average	8.0	5,577
Maximum Day	12.5	8,472
Minimum Day	4.4	3,056
Maximum Day Peak Hour	16.3	11,319
Minimum Day Peak Hour	6.8	4,722
Maximum Month Average Daily	10.8	7,500
Minimum Month Average Daily	5.9	4,097

Using the design population estimates from Table 3 and the 2005 water demands, the projected water demands for the city were developed (see Table 15). 2005 average per capita consumption is approximately 198 gallons per day (gpd). During maximum consumption days, per capita usage climbs to 295 gpd. Comparing maximum day consumption to annual average day consumption indicates an approximate maximum day peaking factor of 1.4.

Table 15. 2005 to 2025 Projected El Centro Water Demands

Year	Population	Average Day (GPD)	Maximum Day (GPD)	Maximum Day Peak Hour Demand (GPD)	Maximum Day Peak Hour Demand (GPM)
2005	40,386	8,003,125	12,204,000	17,604,000	12,225
2010	42,829	8,480,142	13,180,320	19,012,320	13,202
2015	45,311	8,985,591	14,234,746	20,533,306	14,259
2020	47,760	9,521,167	15,373,525	22,175,970	15,399
2025	50,109	10,088,665	16,603,407	23,950,048	16,631

Table 13 displays water consumption by user category for 2000 through 2025. Table 12 shows the number of billed customers in 2005. Single family residences' water usage comprises approximately 60% of the total amount of water that is billed by the city. Multiple family housing units (apartments, duplexes) use a further 14%, thereby bringing the portion consumed by residences to approximately 75% of the total water usage.

Single family homes' water usage is very seasonally dependent, largely due to increased landscape irrigation during the hot summer months. Winter usage by all residences is only 55% of that during summer months. Residences consume more than all other users and have the most fluctuation in monthly usage. Commercial and Governmental customers reduce water consumption during cooler months. Industrial consumption increases substantially during winter; however, industrial usage accounts for less than 2% of the total annual usage. As a result, it appears that nearly all of the summer increase in consumption is caused by landscape irrigation.

Figure 5 shows the total average daily water demand by month. During winter months, production levels average less than 7 mgd, but climb to nearly 11 mgd during summer months. Average water production exceeds 10 mgd during peak days in summer. Figure 6 shows the average daily per capita demand by month. Summer water usage frequently exceeds 250 gpcd while winter consumption is less than 160 gpcd.

Figure 5 - El Centro Total Average Water Supplied by Month

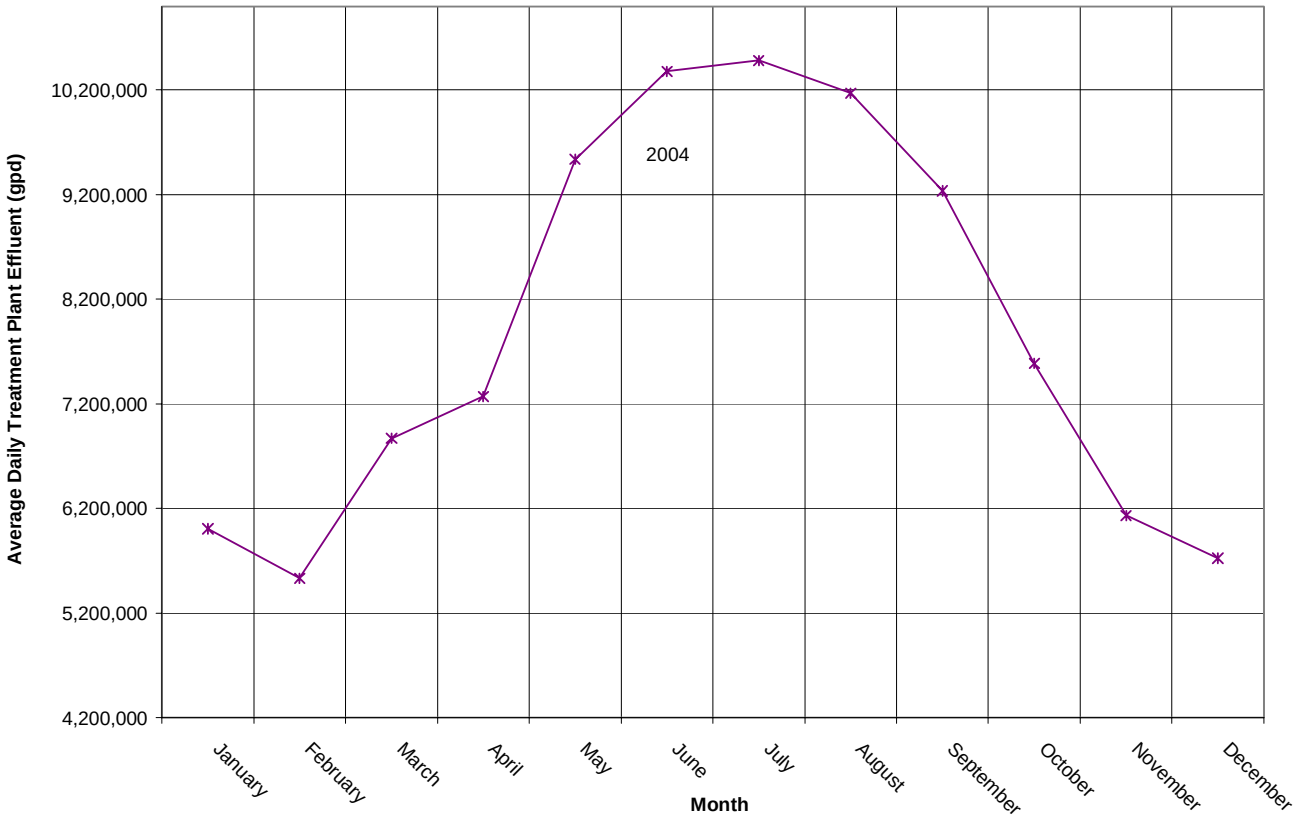
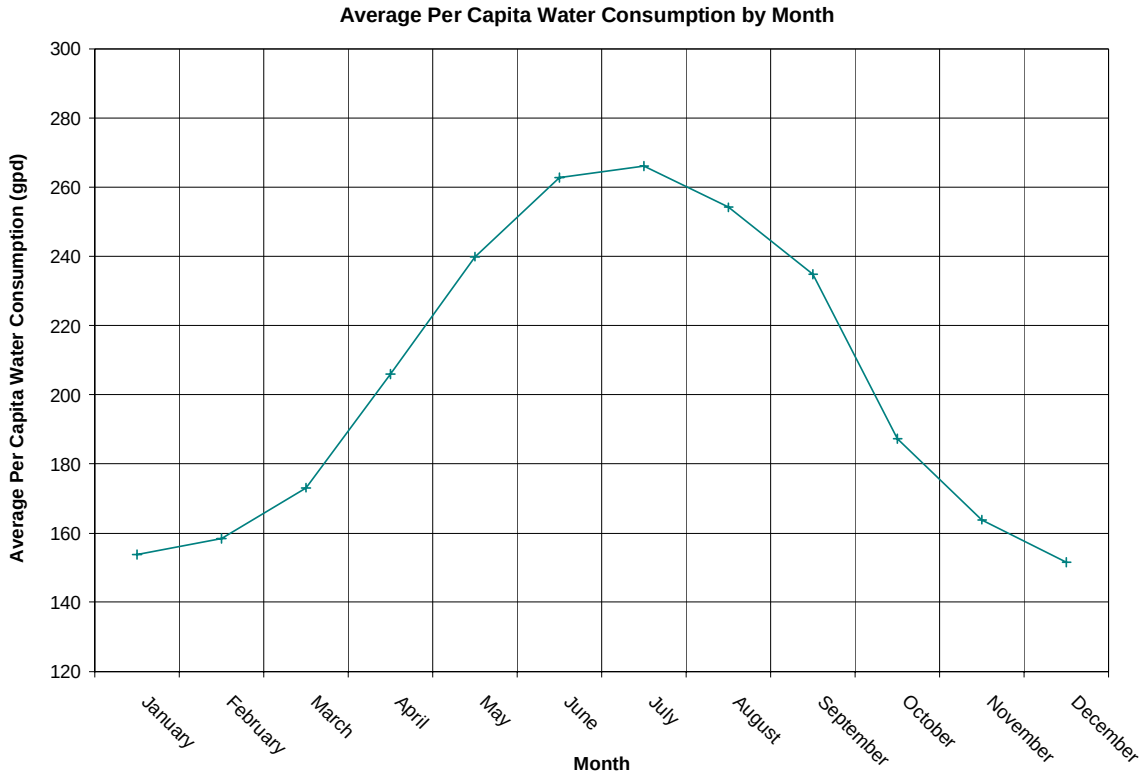


Figure 6 - El Centro Water Consumption per Capita by Month



In conclusion, the volume of water consumed is highly dependent on population fluctuation and partly dependent on housing type. The population is expected to exceed 50,000 by 2025. The amount of additional water consumed will partly depend on the type of housing constructed: single family or multiple family units. Additions of single family homes will place higher demands on the treatment facility and distribution capacity than will multiple family units housing the same population increase. Recent housing construction, mostly south of Interstate 8, has consisted primarily of single family homes. Consumption by governmental and commercial users will likely increase with population. New industrial customers will develop incrementally and are location specific. Large new industrial customers should be examined on a case by case basis to determine the impact on the existing system and its ability to absorb new demand.

Several customers' consumption, consisting primarily of governmental usage, is metered but not billed. Furthermore, many parks and municipal buildings are neither billed nor metered. Non-billed customers and system losses account for greater than 4% of the water treatment plant production (see Table 13).

Imperial Irrigation District Water Use

The Imperial Irrigation District provides wholesale water service. Demand for water in the Imperial Unit service area is divided into three basic categories: agricultural, municipal, and industrial. Historically the Imperial Irrigation District has delivered 98.2 percent of its annual flows to agricultural water users, 1.2 percent to municipalities, and 0.6 percent for industrial purposes.

Raw water use by the Imperial Irrigation District is shown in Table 14. The Imperial Irrigation District's consumptive use values, listed in Table 14, include the total use of raw water in the Imperial Unit. These consumptive use values include agriculture, small acreage, service pipes, municipalities, industrial, losses and unaccounted for raw water. There is no available data that completely distinguishes between these uses of raw water.

Table 16. IID Annual Water Use (Historical, Projected and Water Conservation and Transfer Programs/Projects

Water Use	1995	2000	2005	2010	2015	2020	2025
Consumptive Use (includes agricultural, service pipes, municipalities, industrial, and unaccounted losses)	3,070,582	3,112,951	2,910,000	2,722,300	2,677,300	2,652,300	2,627,500
Water Conservation & Transfers							
IID/MWD Transfer4&5	74,570	109,460	110,000	110,000	110,000	110,000	110,000
IID/San Diego County Water Authority Transfer	0	0	80,000	180,000	200,000	200,000	200,000
IID/Coachella Valley Water District Transfer	0	0	o	20,000	45,000	70,000	70,000
AAC Lining Conservation (MWD)	0	0	0	56,200	56,200	56,200	56,200
AAC Lining Conservation (San Luis Rey Indian Water Rights Settlement Act)	0	0	0	11,500	11 ,500	11,500	11,500
Total (Acre-Feet)	3,145,152	3,222,411	3,100,000	3,100,000	3,100,000	3,100,000	3,100,000
Units of Measure: Acre-Feet							

Decree accounting consumptive use data from Compilation of Records in Accordance with Article V. of the Decree of the Supreme Court of the United States in Arizona v. California Dated March 9. 1964 for Calendar Years 1990 and 1995, by the U.S. Department of the Interior Bureau of Reclamation Lower Colorado River Region, pp. 14-17.
1 Estimated using provisional water use data from Diversions from Mainstream-Available Return Flow & Consumptive use of Such Water Calendar Year 2000, by U.S. Department of the Interior Bureau of Reclamation Lower Colorado River Operations, March 7.2001, Provisional Water Use 2000.
2 Voluntary cap as per the proposed Quantification Settlement Agreement (QSA) for the Colorado River, value closes "Total" to 3,100,000 acre-feet.
3 Imperial Irrigation District All American Canal (38 Years), p. 1.
4 Key Terms for Quantification Settlement among tire State of California, lID, CVWD, and MWD, October 15, 1999 p. 4.
5 Agreement for Transfer of Conserved Water by and between Imperial Irrigation District, a California irrigation district ("IID"), and San Diego County Water Authority. a California county water authority ("Authority"), 1998. Article 3 Quantity, p. 13. At full implementation project savings are between 130,000 and 200,000 acre-feet.
6 Key Terms for Qualification Settlement among the State of California, lID, CVWD, and MWD, October IS, 1999. pp. 6 & 8.
7 Key Terms for Quantification Settlement among the Stale of California, lID, CVWD, and *MWD,* October IS, 1999, pp. 10 & II.

Water distribution systems lose water during distribution for several reasons. Specific water distribution losses depend on the type of distribution system. A piped water distribution system can lose water due to pipe failures or leaks. Open channels, ponds, reservoirs, and water basins can lose water from seepage through the soil, surface evaporation into the air, and plant consumption.

An open channel, gravity flow water distribution system has operational discharges. Operational discharges are excess flows discharged from a channel into another channel or drain. Operational discharges can result from: carriage water that is required to fill and empty the reaches of sloping channels; excess water delivered to

a channel to ensure adequate and constant delivery to the water users; increases in water user flexibility for water ordering and delivery scheduling; and terminating water deliveries during rainfall events, storm runoff, and flood flows.

The Imperial Irrigation District has an open channel gravity flow water distribution system. Its water distribution system losses result from three major conditions: seepage, operational discharges, and evaporation. The Imperial Irrigation District's water distribution system losses have been reduced through the years by numerous water conservation and demand management programs and projects. The demand management programs and projects are described in detail in the Imperial Irrigation District Demand Management Section of this plan.

Agricultural Water Use in the Imperial Valley

There are over 120 types of crops grown in the Imperial Valley. Most relevant to the Water Element is an examination of the various crop types, the acreage dedicated to each and the demand for irrigation water generated by each crop per acre of cultivation. Water demand is provided below on a "net consumption" basis and is based upon historical acreage and water use data. Major water consuming crops include alfalfa (5.20 ac.ft./acre), asparagus (4.12 ac.ft./acre), cotton (3.45 ac.ft./acre), and tomatoes (2.23 ac.ft/acre). More efficient crops include carrots (1.21 ac.ft./acre), squash (1.58 ac.ft./acre), and barley (1.64 ac.ft./acre). The historical trend indicates that approximately 525,000 acres are in cultivation over the year and that crops grown on this acreage consume approximately 1,771,000 acre feet per year. Table 2 shows the historical average of individual crop acreage and water use in Imperial Valley over a ten year period.

Table 17. IID Crop Acreage and Water Use in Imperial Valley (Historical Average)

Crop	Area (Acres)	Water Use (af)
Garden Crops		
Broccoli	7,000	11,480
Carrots	12,000	14,540
Lettuce	35,000	47,017
Cantaloupes	15,000	33,213
Watermelons	5,000	10,929
Other Melons	4,000	8,903
Onions	10,000	17,725
Squash	1,000	1,578
Tomatoes	3,000	6,695
Vegetables (misc.)	5,000	8,083
Field Crops		
Alfalfa	185,000	961,692
Barley	1,000	1,650
Bermuda Grass	15,000	52,125
Cotton	40,000	137,900
Rye Grass	4,000	9,500
Sorghum	3,000	7,330
Sudan Grass	20,000	47,500
Sugar Beets	35,000	122,208
Wheat	105,000	204,488
Miscellaneous	2,000	4,695
Permanent Crops		
Asparagus	3,000	12,355
Citrus Fruits	2,000	7,163
Duck Ponds (feed)	8,000	24,000
Jojoba	3,000	10,745
Trees and Vines	1,000	3,582
Miscellaneous	1,000	3,982

Source: Water Requirements and Availability Study. Prepared by Parsons Water Resources, Inc. for the IID. November 1985.

Agriculture is the most highly water consumptive use in Imperial County. Approximately ninety-eight percent of the water diverted to Imperial County from the Imperial Irrigation District is used for agricultural purposes. Imperial Irrigation District supplies more than 2,500,000 acre-feet of water annually for primarily agricultural purposes to its customers in Imperial County, which contains over 500,000 acres of irrigated farmland.

Supply and Demand Comparison Provisions

Law

> 10635 (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from the state, regional or local agency population projections within the service area of the urban water supplier.

Supply and Demand Comparison

El Centro receives water from the Imperial Irrigation District, a State of California power and water utility that provides service to Imperial County. Under its responsibilities as a State authorized water purveyor, the IID is required to deliver water to El Centro. The cost for water delivery is reviewed annually by the Imperial Irrigation District. The treatment plant day operator files daily water requests with the district 24 hours prior to delivery. The IID manually adjusts the canal gates and monitors the flow to the plant at both inlets several times daily.

Table 18 compares current and projected water supply and demand. It is important to note that the City of El Centro has sufficient water to meet its customers' needs, through 2025 during Single Dry year and Multiple Dry years.

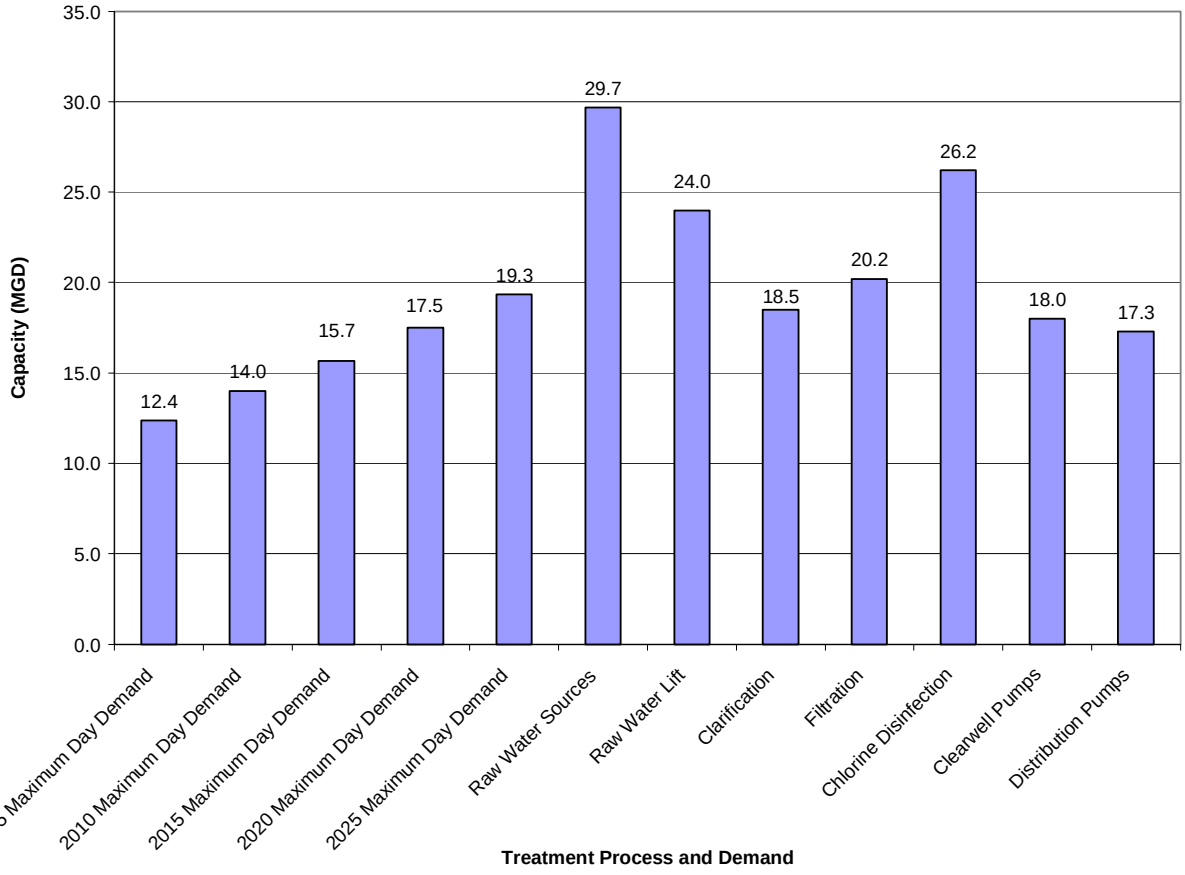
Table 18. Projected Supply and Demand – City of El Centro					
	2005	**2010**	**2015**	**2020**	**2025**
Supply (treated) totals	15,841	33,600	33,600	33,600	33,600
Demand totals	9,089	9,544	9,985	10,509	11,070
Difference (surplus)	**6,752**	**24,056**	**23,615**	**23,091**	**22,530**
Units of Measure: Acre-feet/Year					

Table 19. Flow Capacities of the El Centro Water Treatment System

Component	Number of Units	Individual Unit Capacity (gpm)	Individual Unit Capacity (mgd)	Total Capacity (gpm)	Total Capacity (mgd)
Water Sources					
Date Canal	1	15,708	22.6	15,708	22.6
Dahlia Lateral Number 1	1	6,250	9.0	6,250	9.0
Raw Water Pumping Structure	4			16,700	24.0
Water Treatment					
Clarifiers	2	7,300 & 5,550	10.5 & 8.0	12,850	18.5
Filtration	3	4,680	6.7	4,680	20.2
Chlorination	2	9,100	13.1	18,200	26.2
Clearwell Pumps	3	4,200	6.0	12,600	18.1
Water Distribution from Plant					
Booster Pump Station at Plant	3	3,600	5.2	10,800	15.6
30-inch pipe from treatment plant [1]	1	22,014	31.7	22,014	31.7

[1] Flow capacity based on maximum allowable velocity of 10 feet per second during maximum consumption day and fire flow

Figure 4 - El Centro Water Supply Capacities Supply and Demand Comparison



Water Treatment Plant Distribution Pump Station

Two booster pumping stations pressurize the water distribution system to the 60 psi operating pressure. One is located at the water treatment plant and the other is at the storage facility on La Brucherie Road. Three pumps at the treatment facility increase the pressure of the water to the normal distribution pressure. A fourth pump is original to the facility and is rated to pump at 40 psi. The three pumps were installed in 1993 when the system operating pressure was increased from 40 to 60-psi. Each is a 200 horsepower (hp) variable speed pump that has a capacity of 4,000 gpm at a 60 psi. The antiquated pump is a constant speed centrifugal pump that can pump

4,500 gpm at 40 psi. At 60 psi, its efficiency and capacity are extremely reduced. As a result, it is used solely as a backup in the event that extra capacity becomes necessary or if the system's pressure is reduced significantly. Currently, the plant has a pumping capacity of 12,000 gpm with all three 200-hp pumps operating at full capacity. When a fourth 200-hp pump becomes available, the treatment plant's pumping capacity will increase to 16,000 gpm. During the 2000 maximum day peak hour demand, 11,300 gpm were consumed.

La Brucherie Distribution Pump Station

At the La Brucherie facility, two pumps that are identical to those at the treatment plant pressurize the water to the system's normal operating pressure. There, two 200-hp variable speed pumps can each pump 3,500 gpm at 60-psi. The total pumping capacity of the La Brucherie facility is 7,000 gpm.

Water exits the La Brucherie pumps to the distribution system through an 18-inch cement mortar lined (CML) steel pipe. Water enters the storage tanks through the same 18-inch steel pipe. Water entering and exiting the facility is metered through a 12-inch meter. This produces a significant loss in pressure while water is entering the distribution system and it places higher demand on the station's pumps. For the same quantity of water to flow through the 12-inch meter as through the 18-inch pipe, the water's velocity must be much greater. The water experiences significant head loss from flowing through a different sized pipe and from frictional losses that increase substantially with the higher velocity. As a result, the pressure of the water after flowing through the meter is roughly 10 psi less than when it exits the pumps (at maximum flow).

Therefore, the exiting pressure of the pumps at the La Brucherie station must be set higher than the normal 60-psi operating pressure. This places more electrical demand on the pumps that could be reduced if the current meter were replaced with an 18-inch meter.

Imperial Irrigation District Supply and Demand

The selected average or normal water year for this report is 1995. The Imperial Irrigation District's yearly median water use volume for 1994 through 1998 is equal to 1995's volume of water. For the purposes of this plan the "single dry water year" term is changed to "single reduced demand water year." Increased water demand in the Imperial Unit will be offset in future years with increased water conservation measures.

The 1992 annual water use volume was lower than the 1991 annual water use volume. The Imperial Irrigation District's lowest water use year during the 1989 through 1998 time period, was the years 1991 and 1992. Table 5.2.1 lists the supply reliability and demand comparison for a single reduced demand water year and for multiple reduced demand water years.

Table 20. Supply and Demand Comparison – Normal Year - IID

	Avg./Normal Water Year	Single Reduced Demand Water Year	Multiple Reduced Demand Water Years		
			Year 1 (1991)	Year 2 (1992)	Year 3 (1993)
Imperial Irrigation District Supply Totals	3,373,233	3,463,992	3,375,173	3,463,992	3,457,909
Imperial Irrigation District Demand Totals	3,070,582	2,572,659	2,898,963	2,572,659	2,772,148
Difference	302,651	891,333	476,210	891,333	685,761
Unit of Measure is Acre-feet/Year					

1 Water supply calculated using data in the *Compilation of Records* in *Accordance with Article V of the Decree of the Supreme Court of the United States in Arizona v. California Dated March* 9. *1964,* Calendar Years 1991, 1992, 1993, and 1995 by the U. S. Department of the Interior Bureau of Reclamation Lower Colorado Region.

2 Decree accounting consumptive use from the *Compilation of Records* in *Accordance with Article V of the Supreme Court of the United States in Arizona v. California Dated March* 9,1964 Calendar Years 1991, 1992, 1993, and 1995, by the U. S. Department of the Interior Bureau of Reclamation Lower Colorado Region.

Water Demand Management Measures

Law

> 10631 (f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:
> (1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following…

City of El Centro Demand Management

Figure 7 shows that average daily per capita water demand has declined in the last five years. Average daily water use has ranged from about 218 gallons per capita day (gpcd) to approximately 158 gpcd in 2004. Maximum day per capita consumption has also decreased substantially since 2000 (see Figure 8).

Figure 7 – Average El Centro Water Consumption per Capita by Year

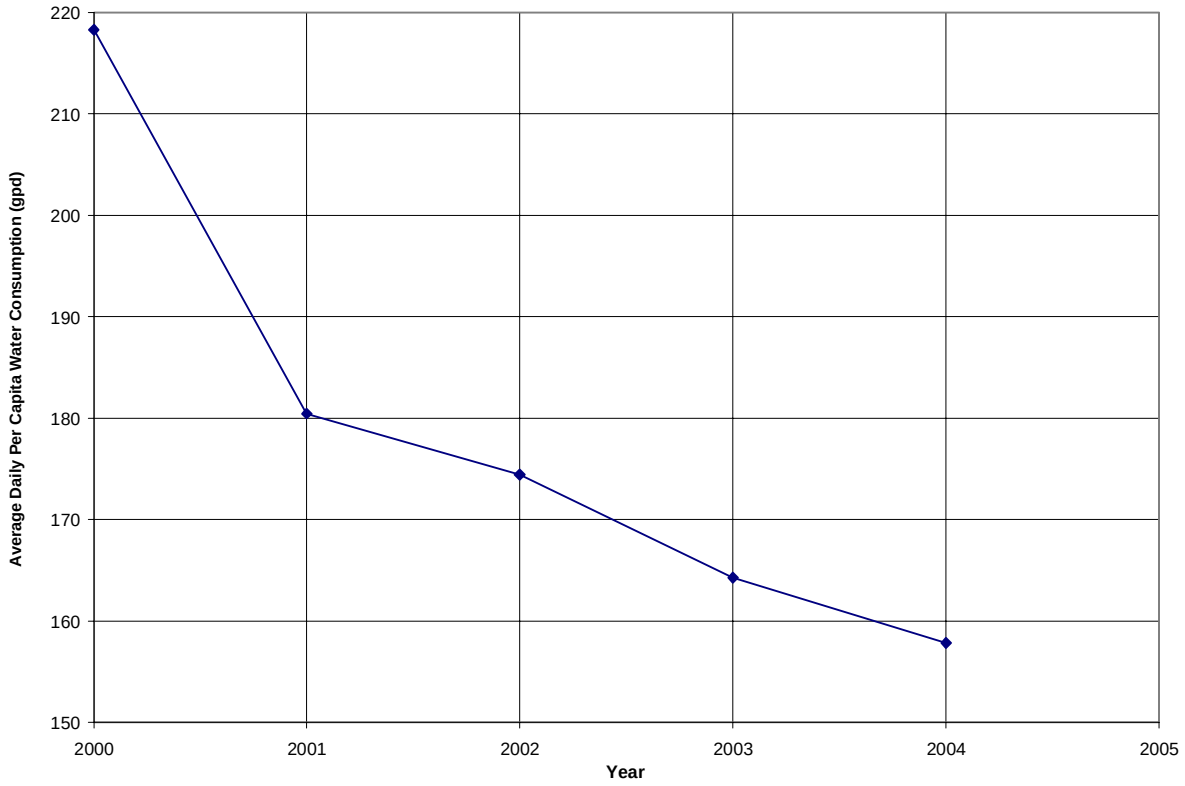
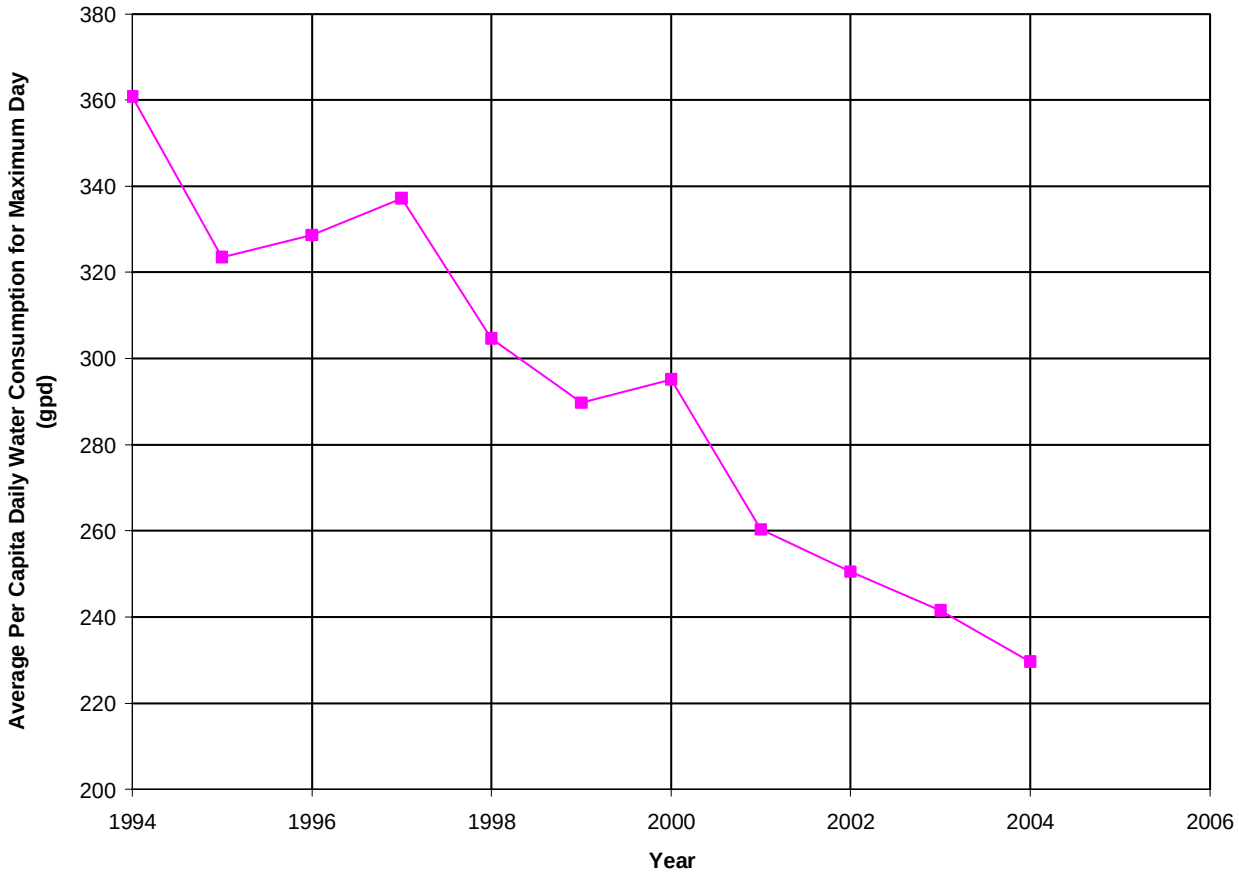


Figure 8 – Average El Centro Water Consumption for Maximum Day per Capita by Year



Although the City has no official water conservation program in place, the average per capita water consumption has continued to decrease. This is probably attributable to new construction and rehabilitation of existing structures using low flow plumbing fixtures per the Uniform Plumbing Code.

The City prepared, adopted and implemented a Water Master Plan in 2001 to identify planned domestic water treatment and distribution facilities required to accommodate planned growth in El Centro. The Water Master Plan addresses the adequacy of the existing system to meet the water needs of the existing community, improvements to mitigate existing deficiencies, and improvements to provide water service to future development projects. The capacity of the facilities recommended in the Water Master Plan is based on buildout of the land uses and development intensity

identified in the General Plan Land Use Element.

Imperial Irrigation Demand Management

It is unlikely that the urban water supply of Imperial Irrigation District would ever be affected, even under shortage or drought conditions on the Colorado River. Urban water use in the Imperial Unit makes up less than two percent of the total water delivered by the Imperial Irrigation District. Under a worst case water supply scenario, the Imperial Irrigation District is confident it can meet the demands of urban water users.

Due to the high quality of the Imperial Irrigation District's water rights, Colorado River flows, and the storage facilities on the Colorado River it is highly unlikely that Imperial Irrigation District's water supply will be affected, even in dry years. See Water Supply Section, pages 15 through 20, for water right details. The entire southern California region, both urban and agricultural, would be in a severe drought emergency before the Imperial Valley's water supply is threatened. Historically, the Imperial Irrigation District has never been denied the right to divert the amount of water it has requested for agricultural irrigation and other beneficial uses.

In the event that there is a water shortage in the Lower Colorado River Basin, the Imperial Irrigation District/San Diego County Water Authority water transfer agreement states that both agencies will share, on a pro-rata basis, any reductions in water to Imperial Irrigation District should a shortage declaration by the Secretary of the Interior for the Lower Colorado River Basin affect the Imperial Irrigation District's water conservation and transfer programs. When the amount of water in usable storage in Lake Mead is less than 15 million acre-feet and the unregulated inflow into Lake Powell is forecasted to be less than 8.8 million acre-feet, the

Imperial Irrigation District and the San Diego County Water Authority have agreed to meet and confer to discuss a supplemental water transfer agreement in anticipation of

the shortage.

Should operating conditions on the Colorado River indicate Imperial Irrigation District may be impacted by reductions in water deliveries; the Imperial Irrigation District will notify all of its water users by mail and will conduct an educational outreach program in conjunction with the local media and municipal water systems. The notice will request all water suppliers, and in particular residential, industrial, and commercial water users, to conserve water on a voluntary basis. Urban water suppliers will be responsible for notifying their customers and implementing their own voluntary water conservation measures and programs.

Urban water supply reductions in the Imperial Unit are not likely to occur during the next twenty years. Action stages are noted in this plan in order to comply. with California's Urban Water Management Planning Act requirements and have not been approved by any of the agencies participating in this plan. Urban water supply shortage stage one is voluntary, has cut back conditions of less than 15 percent, and is estimated to provide up to 79 percent of the reduction goal for urban water suppliers. Urban water supply shortage stage two is voluntary, has cut back conditions of 15 percent to less than 25 percent, and is estimated to provide 7 to 12 percent of the reduction goal for urban water suppliers. Urban water supply shortage stage 3 is mandatory, has cut back conditions of 25 percent to less than 35 percent, and is estimated to provide the remainder of any reduction goals for urban water suppliers. Mandatory provisions to reduce individual urban consumer water use are beyond the jurisdiction of the Imperial Irrigation District. Any urban water use reductions or restrictions are the responsibility of individual urban water suppliers who treat and distribute water within the Imperial Unit.

Future and current Imperial Irrigation projects and programs

Water Conservation

The Imperial Irrigation District (IID) has initiated many water conservation programs in Imperial County. They have also participated in various programs in cooperation with

governmental agencies. In addition, the District has offered public education programs and has encouraged innovative on-farm practices in the Imperial Valley. Its commitment to efficient regional water use management was most clearly demonstrated by the Water Conservation Agreement between Imperial Irrigation District and the Metropolitan Water District of Southern California.

Past water conservation efforts using innovative and creative programs have also helped Imperial Irrigation District to reduce water consumption. Some of these programs include structural, operational, administrative, educational, cooperative, and on-farm programs. Each of these programs is discussed in more detail below.

Water Conservation Agreement

This Agreement provided for the implementation of water conservation projects, to be funded by the Metropolitan Water District, during a five year period. The projects are to result in an estimated conservation of 106,110 acre-feet of water annually. The funding from the Metropolitan Water District covers the costs of construction, operation, and maintenance of projects. In return for funding these projects, and subject to conditions contained in the approved agreement, the Metropolitan Water District is eligible to divert additional water, equivalent to the amount of water conserved, through its Colorado River Aqueduct, which has its headworks at Lake Havasu, created by Parker Dam along the Colorado River.

Eighteen projects were selected for inclusion in the water conservation program based on individual cost-effectiveness, and as a reflection of the need to have a well-balanced overall program. The average amortized cost for the projects was estimated at $128 per acre-foot in 1988 dollars. Construction of the projects began in February of 1990, and is scheduled for completion in December of 1994. Table 4 shows the water conservation projects that had been completed as of December 28, 1990. In addition, the estimated water conserved is also shown for each project.

Table 21. IID Water Conservation Projects and Estimated Water Conserved

Project Description	Annualized Water Conserved
Carter Reservoir	4,930 af
South Alamo Canal-Phase I	1,180 af
South Alamo Canal-Phase II	848 af
Lateral Canal Lining	6,706 af
12-Hour Delivery	12,000 af
Vail Supply Canal Lining	79 af
Non-Leak Gates	125 af
System Automation	324 af
Westside Main Canal Lining	508 af
Total Water Conserved	**26,700 af**

Source: "IID/MWD Water Conservation Agreement." Issue paper by Robert Lang, Assistant Manager, Imperial Irrigation District, February, 1991.

To fully understand the effort that the Imperial Irrigation District has expended in achieving their water conservation goals, the following is an update on the status of the water conservation projects:

Trifolium (Carter) Reservoir

The completion of this project in 1988 utilized a Clean Water Bond, and consisted of a 340 acre-foot regulating reservoir. The project was to eliminate operational discharge at the end of the Westside Main Canal. The project is to conserve 4,930 acre-feet of water annually.

South Alamo Canal Lining-Phase I

Two miles of this large supply canal were lined and completed in August of 1989 with the assistance of a Clean Water Bond. Seepage of water was reduced and 1,180 acre-feet of water has been conserved.

South Alamo Canal Lining-Phase II

In addition to the first phase of this project, Phase II consisted of concrete lining the remaining 1.2 miles, and was completed in June of 1991. To date, the Imperial Irrigation District has conserved over 1,425 acre feet of water annually from this project.

Lateral Interceptor

This project consists of utilizing a header canal and 283 pond leveling gates to create a virtual demand system for eight lateral canals. The project will cost $5.7 million and construction is currently underway.

"Z" Reservoir

The District has a total of five regulating reservoirs. Four have been built since 1975 at a total cost of $3.3 million and provide a total storage capacity of 1,570 AF. It is estimated that 6,200 AF of water is conserved annually through the use of these reservoirs, which help reduce operational spills from the canal systems they serve. The fifth reservoir is presently under construction and consists of a 400 AF capacity regulating reservoir. The project carries a cost of $2.8 million and will conserve water by eliminating operational spills at the end of East Highline Canal.

Lateral Canal Lining

Between February and December of 1990, the Imperial Irrigation District concrete lined over 62 miles of lateral canals. The District is to concrete line 265 miles by December of 1994. This project will reduce seepage and increase efficiency of the canal delivery system. The project is projected to cost $50 million and has, to date, conserved over 6,846 acre-feet of water annually.

Trifolium Interceptor

This project is similar to the Lateral Interceptor, in that its main purpose is to use a header canal and pond leveling gates to eliminate operational spills and minimize tailwater. The project encompasses thirteen large lateral canals and is projected to cost $10 million. Research and design of this project are still underway.

Twelve-Hour Delivery

In the past, water delivery to farmers of the Imperial Valley was on a fixed 24-hour basis. In February of 1991, the Imperial Irrigation District initiated a new program which allows farmers to order small delivery heads (up to 7 cubic feet per second) on a fixed 12-hour basis. The program also allows for cutoff of the delivery within the last four hours, if the canal capacity permits. The farmers in the Imperial Valley have widely accepted this program. The program is estimated to conserve approximately 12,000 acre-feet annually.

Non-Leak Gates

This project consists of replacing the old wooden canal check gates with non-leaking aluminum gates. These types of gates were installed in June of 1990. This project has enhanced the operation of canals and also prevented water leakage. The five gates have conserved an estimated 125 acre-feet of water per year. The installation of all remaining gates is expected to be completed by the end of 1992.

Lowline Interceptor

This project is another lateral interceptor which will collect operational discharge and minimize spill from approximately sixteen other lateral canals. The project will cost $5.3 million, and construction is scheduled to begin in 1993. The project is currently in the

research phase of development.

Irrigation Water Management

Funds are used for this project to construct water conservation systems on farms. The purpose is to educate farmers on the most advanced irrigation management techniques by providing training and support. Agricultural engineers from Imperial Irrigation District plan to implement this program onto 10,000 acres of farmland. Pump back, drip irrigation and other systems, along with updated irrigation planning techniques, are used for water conservation. Thirty-four on-farm systems are currently in development.

System Automation

This project is by far the most innovative water conservation program. The cost is $15 million, and it will radically improve Imperial Irrigation District's control of water delivery. Computers will be located on fields and will control the water gates to manage the delivery of water more accurately. The monitoring of the computer will be done by a radio-microwave system from a master water control center.

This will centralize water management and monitoring for Imperial Irrigation District. Approximately 200 field sites will provide data and be utilized to allow water control never pursued before. The program is composed of over 60 projects and has already seen the automation of five canal headings and the installation of the radio-microwave communications network. A new Water Control Center will be added to the system and is scheduled to be operational by December of 1991. Other water conservation programs include land leveling, tailwater pump back systems, low water-use crop selection, and low water-demand irrigation methods.

Structural Programs

Structural programs to conserve water include physical changes to the water conveyance and usage system that will bring about benefits independently of user practices. These programs consist of such projects as canal lining to reduce seepage losses; construction of regulating reservoirs to reduce canal spill; construction of seepage recovery lines to collect water to be pumped back into the canal for delivery to farms; farm delivery and outlet structures to provide for better water control and measurement of farm deliveries and to facilitate measurement of tailwater runoff; automatic controls and remote monitoring facilities to be operated manually in case of power outages; and construction of evaporation ponds to reduce inflow into the Salton Sea.

Operational Programs

Operational Programs refer to changes in operational procedures that have been initiated to promote water conservation. Operational programs include radio equipment and personnel training. Communication among personnel permits greater operational flexibility in switching water deliveries from one farmer to another, thereby reducing operational spills.

As newer methods are used and more structures are built, water department employees must be trained to manage and operate them. Daily on-the-job training is an integral part of the program. In addition, specialized training in water measurement and

management is given to the new hydrographers. Keeping up on the latest methods of water management and operations can help in conserving water for Imperial County.

Administrative Programs

These programs are options that are available to public distributors of water. An example of this would be the establishment of incremental water rates to encourage water conservation. The IID Board of Directors, recognizing the need to continue to expand water conservation efforts, appointed a Water Conservation Advisory Board made up primarily of farmers in 1979. The purpose of the Advisory Board is to make recommendations to the District Board regarding the implementation of additional water conservation measures.

The District approved a water conservation program called the "13 Point Program" in 1976. The overall goal of this program was to improve water use efficiency within the District and reduce inflow into the Salton Sea. Another program, the "21 Point Program", was recommended by the Water Conservation Advisory Board and adopted by the District.

Educational Programs

Educational programs have been implemented to encourage water conservation within the Imperial Valley. These programs range from public meetings to get input from the property owners themselves, to full-scale demonstrations so that others can see how new irrigation techniques and methods are used.

Cooperative Programs

The District has been involved in various cooperative studies and programs to research innovative water conservation methods. Different levels of involvement have been required of the District. For example, the District has helped the USDA Research Station in El Centro by constructing a lysimeter to determine crop water consumption; helped to construct an underground soil column laboratory, a reservoir, and a pumping station; installed four evaporation and weather stations; and provided labor, equipment, and materials for a five year irrigation efficiency study.

The District has also cooperated with the University of California Irrigation Management Information System and mobile laboratory programs sponsored by the University in conjunction with the California Department of Water Resources (DWR).

On-Farm Irrigation Programs

Farmers have been practicing on-farm irrigation methods to conserve water. Agricultural lands must be tiled, graded, and prepared for the application of water. Tile drains have been installed and, in addition, head ditches have been lined to reduce water loss due to seepage. This program is still in effect.

Future and current County of Imperial projects and programs

Imperial County is seen as one of the most, if not the most, agriculturally productive regions in the world. In order to continue the deserved reputation of supplying the world with high quality food crops, the County must appreciate and conserve its vital resources which enable the production of such valuable crops. One of these important vital resources is water. The County must recognize and consider the future of its economy and agriculture is the primary sector. Obviously, the continued urban growth in the County is equally dependent upon receiving adequate water resources.

Through water conservation measures, programs, and policies, the County and the District will continue to efficiently utilize this valuable resource as it has done in the past. Also, water conservation projects with other agencies such as the "Water Conservation Agreement between Imperial Irrigation District and the Metropolitan Water District of Southern California" will enhance the availability of water within the County and encourage additional water conservation projects. With continued monitoring of the surface waters in Imperial County by the Imperial Irrigation District and others, any increase in salt concentrations can be addressed in order to enhance water quality.

Recognizing that water is a vital resource, continued cooperation and coordination between Imperial County and other Local, State, and Federal agencies, water resources can be conserved and used for all approved beneficial purposes, including continued growth and development in all economic sectors. Also, continued planning and coordination efforts by the County can assure that future developments will not only enhance the economy, but may also encourage various industries to relocate and create a more broad based economy in the County.

Overall, Imperial County has great potential to wisely utilize its water resources and

enhance the quality of water for all beneficial uses. Strategies should be carefully planned and incorporated into the decision making process of the County to assure adequate conservation of its water resources and the availability of water in the future.

Policies and Programs

The following policies are statements of purpose and/or direction that are meant to help guide decision makers in making judgments on issues concerning water resources in the County. These policies specifically address the Objective of the Water Element, which in turn accomplish the Goals of the Element. The Policy is presented first for each sub-heading, followed by more specific program statements.

1. Adequate Domestic Water Supply

Policy

It is the policy of the County of Imperial is to implement efficient regulation of land uses that economizes on water consumption, enhances equivalent dwelling unit demand for domestic water resources, and that makes available affordable resources for continued urban growth and development.

Programs

- The County of Imperial shall regulate and encourage the economical use of domestic water resources through the implementation of applicable State codes and the promotion of drought resistant native and non-native desert landscaping in all types of urban development.

- The County of Imperial shall encourage the distribution of water conservation literature and signage in public restaurants, hotels, and motels as a means of preserving domestic water treatment and wastewater treatment facility capacities.

- The County of Imperial shall encourage the distribution of low cost water conservation technologies and literature to all households in the County as a means of assuring an affordable quality of life and of preserving the capacities of domestic water treatment and wastewater treatment facilities.

- The County of Imperial shall encourage the metering of agricultural and urban water use, including encouraging municipalities to initiate water metering programs to promote more thoughtful and economical use of domestic water.

- The County of Imperial shall assure the enforcement and implementation of Section 17921.3 of the Health and Safety Code, Title 20, California Administrative Code Section 1601(b), and applicable sections of Title 24 of the State Code through the development and building permit process.

- The County of Imperial shall study the appropriateness of and need for impact and/or development fees, which can be used to preserve important water resources and assure their long-term availability.

- The County of Imperial shall take an active role in soliciting the support of State and Federal agencies, particularly the California Water Quality Control Board and the U.S. Environmental Protection Agency, in the cleanup of the New River at the International Border.

- The County of Imperial Health Department, Parks and Recreation Department, and other responsible agencies shall maintain programs and regulations to assure safe and healthful water resources for sport, recreation, and wildlife uses.

- The County of Imperial, also with the Imperial Irrigation District, the California Department of Fish & Game, and the U.S. Fish & Wildlife Service, shall cooperate and coordinate the use of water resources to protect and enhance valuable wildlife communities and habitats of the region.

- The County of Imperial shall take an active role in encouraging the development of infrastructure and a regulatory environment in the Republic of Mexico which addresses the chronic pollution of the New River and Alamo River from agricultural, industrial, and urban development.

- The County Health Department shall report annually to the Board of Supervisors on the conditions of the New River at the International Border and within the County, and the progress made by State and Federal agencies in reducing the level of contaminants being carried to the Salton Sea.

- As part of the effort to protect and enhance wildlife and their habitat, the County of Imperial shall actively pursue the preservation, maintenance of breeding and foraging habitat for native and migratory birds and animals, preserving these biological systems as indicators of environmental integrity, and as a source of sport and recreation.

- The County of Imperial shall monitor, coordinate, and cooperate with State and Federal agencies to assure the protection of the Colorado River resource from over utilization and excessive export to protect urban and agricultural interests and to assure the health of the various biological habitats of the Colorado River.

Adequate Agricultural Irrigation Water Supply

Policy

The efficient and cost-effective utilization of local and imported water resources through the development and implementation of appropriate and separate agricultural and urban use areas.

Programs

- The County of Imperial shall play a pro-active role in encouraging the use of efficient and cost-effective methods of water conservation in all aspects of urban development as well as agriculture.

- The County of Imperial shall encourage the reclamation and use of agricultural and urban wastewaters in urban landscaping, golf courses, and wildlife habitat areas wherever practical.

- The County of Imperial shall play a pro-active role in encouraging the efficient use and conservation of the Colorado River resource, and in maintaining an adequate allocation for local agricultural use in Imperial Valley.

4. Protection of Water Resources from Hazardous Materials

Policy

Adoption and implementation of ordinances, policies, and guidelines which assure the safety of County ground and surface waters from toxic or hazardous materials and/or wastes.

Programs

- The County of Imperial shall make every reasonable effort to limit or preclude the contamination or degradation of all groundwater and surface water resources in the County.

- All development proposals brought before the County of Imperial shall be reviewed for potential adverse effects on water quality and quantity, and shall be required to implement appropriate mitigation measures for any significant impacts.

- The County of Imperial shall coordinate with the California Regional Water Quality Control Board and incorporated cities is to assure that discharge from community wastewater treatment plants meet or exceed applicable State and Federal standards.

- The County of Imperial shall play an active role in assuring the advance planning necessary to provide community and/or industrial wastewater treatment facilities which keep pace with continued urbanization in the County.

- The County of Imperial shall support the investigation of innovative methods of wastewater treatment which reduces discharge of contaminants into County surface waters, while enhancing the ruderal and riparian habitats of the County.

- The County of Imperial shall direct staff of the County Health Department, Planning/Building Department, and other appropriate departments, as well as the County Agricultural Commissioner, to review existing ordinances, policies, and guidelines and determine their adequacy in protecting groundwater and surface water from contamination by hazardous materials and/or waste.

- The Imperial County Health Department, as the Local Enforcement Agency, shall continue monitoring operations at the various landfills across the County and shall periodically report on the impacts or potential impacts of these landfills on ground and surface water resources in the County.

- The County of Imperial shall confer and coordinate with the California Department of Health, Regional Water Quality Control Board, and the U.S. Environmental Protection Agency to assure that these agencies are taking active steps to protect and reclaim groundwater and surface waters from contamination.

5. Coordinated Water Management

Policy

Encourage and provide inter-agency and inter-jurisdictional coordination and cooperation for the management and wise use of water resources for contact and non-contact recreation, groundwater recharge, hydroelectric energy production, and wildlife habitat as well as for domestic and irrigation use.

Programs

- The County of Imperial shall confer and consult with the Imperial Irrigation District and incorporated communities of the County to assure a coordinated and coherent water policy for all interested parties in the County.

- The County of Imperial shall actively consult and confer with IID and other Districts, and the incorporated communities of the County regarding the limitation or elimination of impacts to surface and groundwater resources due to agricultural and urban development.

- The County of Imperial shall lend its support to programs and policies of the State Water Resources Control Board, Regional Water Quality Control Board, and other agencies which promote the wise and efficient use of water resources. Particular attention shall be given to the State Water Resources Control Board's regulations pertaining to water quality control and land development.

- The County of Imperial shall regulate land development and natural resource management to protect the limited but important areas of the County which contribute to groundwater recharge.

- The County of Imperial shall support the continuance and development of hydroelectric resources in the County in conjunction with compatible resource protection and management policies.

- The County of Imperial shall encourage the fair and appropriate assessment of fees and charges for the deliveries of urban and agricultural waters, and for water treatment capacity.

- The County of Imperial shall take an active role in maintaining and enhancing river, sea, ruderal, and riparian habitats, as well as other biotic systems in the County which contribute to enhance water resource protection and maintenance.

- The County of Imperial shall cooperate and coordinate with the Regional Water Quality Control Board and other responsible agencies to investigate the potential for the creation of additional wetlands as a means of providing tertiary waste treatment while expanding and enhancing wetlands habitat.

- All County of Imperial departments with responsibility for regulation or jurisdiction for oversight of issues of water resource management shall make every effort to coordinate activities and share information and resources to assure protection of this vital resource.

- The County of Imperial shall act in a pro-active, cooperative, and coordinated manner with Local, State, Federal and International agencies responsible for maintenance of minimal standards for local surface and groundwater resources.

Demand Management Strategies of the County of Imperial

Many of the major water resource issues faced by the County now and in coming years include the threat of continued deterioration of surface and groundwater resources, the possible reduction of available Colorado River water caused by increased demand and adverse climatic conditions, as well as the balancing of urban and agricultural needs with those of plants and wildlife.

Pollution of surface waters from urban development primarily in the Republic of Mexico, but also in the County, continue to pose a serious threat to groundwater and surface water resources in the County. These issues also include the continued increase in salinity of the Salton Sea, as well as the high agrichemical and suspended solids load draining into the Sea, which have an adverse impact on sport fishing and other recreational uses associated with this important resource.

The Water Element goals are developed as broad based statements reflecting the

County's values, aims, and aspirations for management of this vital resource. These goals address the physical development of the County as well as the wise use and preservation of the County's important water resources. The programs set forth herein have been developed to implement the goals and objectives of the Water Element. The policies set forth specific performance requirements for the various plans which relate to water issues in Imperial County.

The goals and objectives are not to be inclusive and are general in nature. They are not to be considered as a means to regulate a specific area. Their main intent is for them to be implemented only to the extent that such implementation is achieved by reasonable regulations or rights therein. The goals and objectives may change at any time to accommodate appropriate growth within the County.

Adequate Domestic Water Supply

Goal 1: The County will secure the provision of safe and healthful sources and supplies of domestic water adequate to assure the implementation of the County General Plan and the long-term continued availability of this essential resource.

Objective 1.1: The efficient and cost-effective utilization of local and imported water resources through the development and implementation of urban use patterns.

Objective 1.2: Cooperation between the Cities and County for the need to maintain, upgrade, and expand domestic water and sewage treatment facilities of the communities within the County, the need for the implementation of appropriate development fees, and the raising of service fees to off-set limited public financial resources.

Objective 1.3: The efficient regulation of land uses that economizes on water consumption, enhances equivalent dwelling unit demand for domestic water

resources, and that makes available affordable resources for continued urban growth and development.

Protection of Surface Waters

Goal 2: Long-term viability of the Salton Sea, Colorado River, and other surface waters in the County will be protected for sustaining wildlife and a broad range of ecological communities.

Objective 2.1 The continued viability of the agricultural sector as an important source of surface water for the maintenance of valuable wildlife and recreational resources in the County.

Objective 2.2 A balanced ecology associated with the riparian and ruderal biological communities important as breeding and foraging habitats for native and migratory birds and animals occurring within the County.

Objective 2.3 Preservation of riparian and ruderal habitats as important biological filters as breeding and foraging habitats for native and migratory birds and animals.

Adequate Agricultural Irrigation Water Supply

Goal 3: The County will secure the provision of safe and healthful sources and supplies of agricultural irrigation water adequate to assure the continuation of agricultural land uses as established by the County General Plan and the long-term continued availability of this essential resource.

Objective 3.1 The efficient and cost-effective utilization of local and imported water resources through the development and implementation of innovative agricultural use patterns.

Protection of Water Resources from Hazardous Materials

Goal 4: The County will adopt and implement ordinances, policies, and guidelines that assure the safety of County ground and surface waters from toxic or hazardous materials and wastes.

Objective 4.1 The development and implementation of infrastructure and regulatory policies in the Republic of Mexico, which reduce contamination of the New River, Alamo River, and the Salton Sea.

Objective 4.2 The provision of safe and efficient community wastewater treatment facilities which adequately service the present and future needs of residential, commercial, and industrial development within the Imperial Irrigation District service area.

Coordinated Water Management

Goal 5: Water Resources shall be managed effectively and efficiently through inter-agency and inter-jurisdictional coordination and cooperation.

Objective 5.1: Encourage and provide for the management and wise use of water resources for contact and non-contact recreation, groundwater recharge, hydroelectric energy production, and wildlife habitat as well as for domestic and irrigation use.

Objective 5.2: Aid in the protection and enhancement of limited water resources so as to provide for the indefinite use and maximum enjoyment.

Planned Water Supply Projects and Programs

Law

10631(h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (l) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

Table 22. Future Water Supply Projects

Project Name	Normal Year AF to agency	Single-Dry AF/Year to agency	Year 1	Year 2	Year 3
New Water Treatment Plant – Construct new filters backwash ponds (Estimated to be Complete 2007)	16,800	16,800	16,800	16,800	16,800
Raw Water Storage – Construct two additional ponds (Estimated to be Complete 2007)	175	175	175	175	175
Line Backwash Pond (Estimated to be Complete 2007)	205	205	205	205	205
Total	17,180	17,180	17,180	17,180	17,180
Units of Measure: Acre-feet/Year					

Development of Desalinated Water

Because of the abundance and cost effectiveness of treating surface water from the Colorado River, there are no plans to use and treat the brackish groundwater as a long-term supply in the Imperial Valley.

Water Shortage Contingency Plan

Preparation for Catastrophic Water Supply Interruption

Law

> 10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:
>
> 10632 (c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

City of El Centro Plan

In the event of extended regional power outages, the City will attempt to attain diesel fuel to maintain the operation of the standby generators that power critical functions at the water treatment plant. The fuel would be brought in every two days. In this way the residents of El Centro would not lose supply of potable water.

In the event of an earthquake that damages critical components of the water treatment plant, the City will divert irrigation water into the potable water distribution system. Under this scenario non-potable water would be delivered to City customers and the water would have to be boiled by each customer prior to potable water use. The water could be delivered by diesel powered pumps to the City's distribution system.

During a shortage the City would increase media attention to the water supply situation and would step up public water education programs, encourage property owners to apply for landscape and interior water use surveys and continue to advertise the importance of customers installing efficient plumbing fixtures.

During declared shortages, or when a shortage declaration appears imminent, the City Manager activates a City water shortage response team. The team includes: water, fire, planning, health, emergency services, public affairs, parks and recreation, and the Mayor's Office. The team has reviewed this 2005-updated Urban Water Management Plan. During a declared water shortage, the City will accept applications for new building permits but will not issue permits until the shortage declaration is rescinded. An appeal process is available and ends at the City Council.

Imperial Irrigation District Plan

The Emergency Preparedness Plan includes required staffs action and procedure to respond to events that impair water operation of canals, laterals, drains, dams, and other facilities. These responses are not normal operation and maintenance activities. Generally, any occurrence that requires an immediate response is classified as an extreme event or emergency.

The Emergency Preparedness Plan defines the role each responsible employee will play during an emergency. Water Department staff conducts emergency and/or disaster response planning in the Water Control Center. Coordination of staffs with other departments will take place in the General Manager's conference room. All American Canal River Division staff planning will be centered in the Imperial Dam Control House. Other staffs meet and coordinate actions at designated areas.

Established actions and procedures exist for extreme events and emergencies that endanger operation of the water system. Possible emergencies/extreme events that endanger operation of the water system could include: earthquakes, storms, rain, run-off from desert washes, flooding, facility or structure damage, power outages, fire, vehicles in canals, equipment theft/vandalism, or other disaster. The Imperial Irrigation District's water delivery and drainage systems do not totally shut down during an emergency.

The Imperial Irrigation District has conducted Emergency Preparedness Exercises in the past. Emergency preparedness exercises will be updated with the development of new emergency preparedness exercises. Water Department staffs trained and participated with the U. S. Department of the Interior Bureau of Reclamation's Tabletop Exercise for emergency preparedness.

For the cities in the Imperial Unit there is a ten-day storage holding capacity requirement. The Imperial County Office of Emergency Services requires this storage holding capacity for cities (Imperial Irrigation District, 1998, p.22).

Supplemental Water Supplies

The City uses water from the Colorado River and a water shortage is almost inconceivable. The City is geographically isolated, has no water system connections to other areas, and has no opportunity for water transfers, wheeling or other exchanges. Groundwater in the area is brackish. The Colorado River is the only water supply for the City in the foreseeable future.

Long Term Additional Water Supply Options

The following table summarizes the actions the City will take during a water supply catastrophe.

Table 23. Preparation for a Catastrophe

Examples of Actions	Check if Discussed
Develop a catastrophe preparedness plan.	✓
Contact and coordinate with other agencies.	✓
Create an Emergency Response Team/Coordinator.	✓
Develop methods to communicate with the public.	✓
Determine what constitutes a water shortage.	✓
Determine how to ‘stretch’ existing water storage facilities	✓
Provide off-line power for water pumping.	✓
Provide emergency water treatment facilities where necessary.	✓
Determine where the funding will come from.	✓
Put employees/contractors on-call.	✓

Water Shortage Contingency Ordinance/Resolution

Law

> 10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:
> 10632 (h) A draft water shortage contingency resolution or ordinance.

The City of El Centro draft water shortage contingency resolutions are located in Appendix C.

Stages of Action

Law

> 10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:
>
> 10632 (a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply and an outline of specific water supply conditions which are applicable to each stage.

Rationing Stages and Reduction Goals

The City has developed a four stage rationing plan (see Table 24) to invoke during declared water shortages. The rationing plan includes voluntary and mandatory rationing, depending on the causes, severity, and anticipated duration of the water supply shortage.

Table 24. Water Rationing Stages and Reduction Goals

Shortage Condition	Stage	Reduction Goal	Type of Rationing Program
Up to 15%	I	15%	Voluntary
15 – 25%	II	25%	Mandatory
25 - 35%	III	35%	Mandatory
35 - 50%	IV	50% or >	Mandatory

Priority by Use

Priorities for use of available potable water during shortages were based on input from the City Emergency Response Team, citizen groups, and legal requirements set forth in the California Water Code, Sections 350-358. Water allocations are established for all customers according to the following ranking system:

- Minimum health and safety allocations for interior residential needs (includes single family, multi-family, hospitals and convalescent facilities, retirement and mobile home communities, and student housing, and fire fighting and public safety)
- Commercial, industrial, institutional/governmental operations (where water is used for manufacturing and for minimum health and safety allocations for employees and visitors), to maintain jobs and economic base of the community (not for landscape uses)
- Existing landscaping
- New customers, proposed projects without permits when shortage declared.

Health and Safety Requirements

Based on commonly accepted estimates of interior residential water use in the United States, Table 25 indicates per capita health and safety water requirements. In Stage I shortages, customers may adjust either interior or outdoor water use (or both), in order to meet the voluntary water reduction goal.

However, under Stage II, Stage III and Stage IV mandatory rationing programs, the City has established a health and safety allotment of 50 gpcd (which translates to 24 HCF per person per year), because that amount of water is sufficient for essential interior water with no habit or plumbing fixture changes. If customers wish to change water use habits or plumbing fixtures, 50 gpcd is sufficient to provide for limited non-essential (i.e. outdoor) uses.

Stage IV mandatory rationing, which is likely to be declared only as the result of a prolonged water shortage or as a result of a disaster, would require that customers make changes in their interior water use habits (for instance, not flushing toilets unless “necessary” or taking less frequent showers).

Table 25. Per Capita Health and Safety Water Quantity Calculations

	Non-Conserving Fixtures		Habit Changes [1]		Conserving Fixtures [2]	
Toilets	4 flushes x 3.5 gpf	14	3 flush x 3.5 gpf	10.5	4 flush x 1.6 gpf	6.4
Shower	5 min x 3.0 gpm	15	4 min x 3.0 gpm	12	5 min x 2.0	10
Washer	12.0 gpcd	12	11.0 gpcd	11	10.0 gpcd	10
Kitchen	4 gpcd	4	4 gpcd	3	4 gpcd	3
other	4 gpcd	4	4 gpcd	4	4 gpcd	4
Gallons per person per day		49		40.5		33.4
CCF per person per year		24		20		16

1 Reduced shower use results from shorter length of shower and reduced flow. Reduced washer use results from fuller loads.
2 Fixtures include ULF 1.6 gpf toilets, 2.0 gpm showerheads, faucet aerators and efficient clothes washers.

Water Shortage Stages and Triggering Mechanisms

As the water purveyor, the City of El Centro must provide the minimum health and safety water needs of the community at all times. The water shortage response is designed to provide a minimum of 50% of normal supply during a severe or extended water shortage. The rationing program triggering levels shown below were established to ensure that this goal is met.

Rationing stages may be triggered by groundwater contamination, power failure, earthquake or other natural disaster.

The City's only potable water source is the Colorado River. Specific criteria for triggering the City's rationing stages are shown in Table 26.

Table 26. Water Shortage Stages and Triggering Mechanisms				
Percent Reduction of Supply	**Stage I Up to 15%**	**Stage II 15 - 25%**	**Stage III 25 - 35%**	**Stage IV 35 - 50% >**
Water Supply Condition				
Supply	Projected supply insufficient to provide 80% of "normal" demand Or	Projected supply insufficient to provide 75% of "normal" demand Or	Projected supply insufficient to provide 65% of "normal" demand Or	Projected supply insufficient to provide 50% of "normal" demand Or
Water Quality	Contamination of 10% of water supply (exceeds primary drinking water standards)	Contamination of 20% of water supply (exceeds primary drinking water standards)	Contamination of 30% of water supply (exceeds primary drinking water standards)	Contamination of 40% of water supply (exceeds primary drinking water standards)
Disaster				Disaster Loss

Water Allotment Methods

The City has established the following allocation method for each customer type. See Appendix C for sample water shortage rationing allocation method.

Single Family	Hybrid of Per-capita and Percentage Reduction
Multifamily	Hybrid of Per-capita and Percentage Reduction
Commercial	Percentage Reduction
Industrial	Percentage Reduction
Govt/Institutional	Percentage Reduction
Recreational	Percentage Reduction - vary by efficiency
New Customers	Per-capita (no allocation for new landscaping during a water shortage.)

Based on current and projected customer demand, Appendix C indicates the water allocated to each customer type by priority and rationing stage during a declared water shortage.

Individual customer allotments are based on a five-year period. This gives the City a more accurate view of the usual water needs of each customer and provides additional flexibility in determining allotments and reviewing appeals. However, no allotment may be greater than the amount used in the most recent year of the five-year base period.

The Water Department Manager shall classify each customer and calculate each customer's allotment according to the Sample Water Rationing Allocation Method. The allotment shall reflect seasonal patterns. Each customer shall be notified of their classification and allotment by mail before the effective date of the Water Shortage Emergency. New customers will be notified at the time the application for service is made. In a disaster, prior notice of allotment may not be possible; notice will be provided by other means. Any customer may appeal the Water Department Manager's classification on the basis of use or the allotment on the basis of incorrect calculation.

Prohibitions, Consumption Reduction Methods and Penalties

Law

> 10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:
> 10632 (d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.
> 10632 (e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.
> 10632 (f) Penalties or charges for excessive use, where applicable.

Mandatory Prohibitions on Water Wasting

The El Centro "No Waste" Ordinance prohibits wasteful water uses such as over-watering lawns and shrubbery resulting in excessive nuisance water in the streets.

Table 27. Consumption Reduction Methods

Consumption Reduction Methods	Stage When Effective
Education Program	All Stages
Demand reduction program	All stages
Voluntary plumbing fixture replacement	All stages
Use prohibitions	All stages
Water shortage pricing	All stages
Voluntary rationing	I
Restrict building permits	II, III, IV
Mandatory rationing	II, III, IV
Percentage reduction by customer type	II, III, IV
Per capita allotment by customer type	IV
Flow restriction for wasters	IV

See Appendix C, the "No Waste" Ordinance and Moratorium on New Connections - which details the reduction methods - regarding Table 27.

Excessive Use Penalties

Any customer violating the regulations and restrictions on water use set forth in the "No Waste" Ordinance shall receive a written warning for the first such violation. Upon a second violation, the customer shall receive a written warning and the City may cause a flow-restrictor to be installed in the service. If a flow-restrictor is placed, the violator shall pay the cost of the installation and removal. Any willful violation occurring subsequent to the issuance of the second written warning shall constitute a misdemeanor and may be referred to the Office of the City Attorney for prosecution. If water service is disconnected, it shall be restored only upon payment of the turn-on charge fixed by the City Council.

Revenue and Expenditure Impacts and Measures to Overcome Impacts

Law

> 10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:
> 10632 (g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier…
> 10632 (g) [An analysis of the impacts of each of the] proposed measures to overcome those [revenue and expenditure] impacts, such as the development of reserves and rate adjustments.

All surplus revenues that the City collects are currently used to fund the Rate Stabilization Fund, conservation, recycling, and other capital improvements. The City estimated projected ranges of water sales by shortage stage to best understand the impact each level of shortage will have on projected revenues and expenditures by each shortage stage.

This analysis is undertaken first with no rate increases and then with a 25% rate increase at Stage II; 50% at Stage III, and a 100% increase at Stage IV. To cover increased expenses and decreased sales, rate increases would need to be "severe". See Appendix D for the City's efforts to establish an Emergency / Rate Stabilization Fund.

Reduction Measuring Mechanism

Law

> 10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:
>
> 10632 (i) A mechanism for determining actual reductions in water use pursuant to the
> urban water shortage contingency analysis.

Mechanism to Determine Reductions in Water Use

Under normal water supply conditions, potable water production figures are recorded daily. Totals are reported weekly to the Water Treatment Facility Supervisor. Totals are reported monthly to the Water Department Manager and incorporated into the water supply report.

During a Stage I or Stage II water shortage, daily production figures are reported to the Supervisor. The Supervisor compares the weekly production to the target weekly production to verify that the reduction goal is being met. Weekly reports are forwarded to the Water Department Manager and the Water Shortage Response Team. Monthly reports are sent to the City Council. If reduction goals are not met, the Manager will notify the City Council so that corrective action can be taken.

During a Stage III or Stage IV water shortage, the procedure listed above will be followed, with the addition of a daily production report to the Manager.

During emergency shortages, production figures are reported to the Supervisor hourly and to the Manager and the Water Shortage Response Team daily. Daily reports will also be provided to the City Council and the Imperial County Office of Emergency Services.

Water Recycling

Law

> 10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. To the extent practicable, the preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies and shall include all of the following:
>
> 10633 (a) A description of the wastewater collection and treatment systems in the supplier's service area, quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

Wastewater Collection and Treatment in El Centro

The City Waste Water Treatment Plant (WWTP) manages wastewater collection and treatment for the City. All of the wastewater flows from the City (including storm water run-off), and is collected and treated at the WWTP. The WWTP treats an average of 3.5 million gallons per day (mgd).

Table 28. Wastewater Treatment

Treatment Plant Name	Location (City)	Average Daily (2005)	Maximum Daily (2005)	Year of Planned Build-out	Planned Maximum Daily Volume
WWTP	El Centro	4.0MGD	4.5 MGD	2040	8.0 MGD

City of El Centro Wastewater Treatment

The City of El Centro Wastewater Treatment Plant (WWTP) consists of a conventional activated sludge treatment facility. The treatment facility started operation in 1957 with several treatment lagoons, and has been upgraded since to produce secondary treatment effluent with UV disinfection and sludge treatment. Overall the WWTP has adequate capacity for the current volume of wastewater produced by the City. Redundancy exists for treatment processes such as the sludge thickener and the sludge dewatering.

Treatment Process Description

The treatment plant is located in the northwestern part of El Centro on La Brucherie Rd. It receives wastewater from residential, commercial, and industrial discharges within the city and a county facility south of the city limits. Figure 1 shows a site plan of the treatment facility.

At present, the treatment plant receives an average flow of 4.0 mgd, with BOD5 and TSS concentrations of 253 mg/L and 207 mg/L respectively. The discharge permit requires 30 mg/L BOD and 30 mg/L TSS in the plant's effluent.. The plant's effluent is 8 mg/L BOD5 and 16 mg/L TSS. The treatment usually provides BOD5 removal efficiency of 97%, and TSS removal efficiency of 91%.

Preliminary treatment consists of a bar screen/washer/compactor equipment combination located at the main lift station, just upstream of the wet well. Wet screenings collected in the bar screen are washed and compacted to reduce their volume. Compacted solids are collected in a movable metal container, where they are stored prior to being disposed of in a private landfill.

Influent wastewater flow is measured through a magnetic flowmeter immediately before entering the influent distribution structure. Influent flow measurements are logged on a chart recorded at the control room. The flow is then distributed to the primary sedimentation basins.

Wastewater flows by gravity from the influent distribution structure into the primary sedimentation units. Each clarifier is the same size, with a 65-ft diameter and a side water depth (SWD) of 8.75 ft.

Sludge treatment at the EC Wastewater Treatment Facility consists of thickening, anaerobic digestion, and dewatering. Primary and waste activated sludge are stabilized through digestion and excess water is removed before final disposal.

The El Centro Wastewater Plant utilizes Ultra Violet radiation for disinfection of the water prior to discharging. UV disinfection of wastewater is a physical process of transferring energy to cellular material of the organisms present. UV radiation is absorbed by the organisms and it has a damaging effect that prevents them from reproducing. When UV energy is absorbed by the organism, structural changes or damage occur that prevent their propagation.

Recycled Water

The City of El Centro provides sewer service and has a wastewater treatment plant which produces secondary (includes de-nitrification) treatment level wastewater. Treated waste water is discharged to percolation ponds. The cost of the City's water supply is $109 AF ($16 per acre foot AF for supply and $93 AF for treatment). The cost of a recycled water distribution system would exceed $250 AF. The use of recycled water in the City of El Centro is unlikely to be cost-effective in the near future.

Wastewater Disposal and Recycled Water Uses

Law

> 10633 (b) A description of the recycled water currently being used in the supplier's service area, including but not limited to, the type, place and quantity of use.
> 10633 (c) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.
> 10633 (d) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years.

Potential for Recycled Water Use

No wastewater is recycled for other uses. The WWTP discharges the treated waste water to IID drainage canals, where it eventually enters the Salton Sea.

Imperial Irrigation District Recycled Water Use

The Imperial Irrigation District does not operate or maintain facilities for potable water recycling, wastewater generation, wastewater collection, or wastewater treatment. The Imperial Irrigation District does allow the reuse of its drainage water within the Imperial Unit service area (Imperial Irrigation District, 1998, Water Rates Schedule No.5 Reuse of Drainage water).

Encouraging Recycled Water Use

Law

> 10633 (e) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

Proposed Actions to Encourage Use of Recycled Water

The use of recycled water in the City of El Centro would not be cost-effective in any foreseeable circumstance. The City has no plans to consider or study the use of recycled water.

Recycled Water Optimization Plan

Law

> 10633 (f) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems and to promote recirculating uses.

Plan for Optimizing the Use of Recycled Water

The use of recycled water in the City of El Centro would not be cost-effective in any foreseeable circumstance. The City has no plans to consider or study the use of recycled water.

APPENDIX A

List Of Groups Who Participated In The Development Of This Plan

Imperial Irrigation District Resources Planning and Management staff
City of El Centro City Planning and Public Works staff
City of Calexico staff
City of El Centro City staff
Imperial County Planning Planning/Building Department staff
Imperial County Public Works Department staff
Members of the public who submitted draft plan comments

Individual Coordinating Agency Staff

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APPENDIX B

Resolution To Adopt The Urban Water Management Plan

CITY OF EL CENTRO
IMPERIAL COUNTY, CALIFORNIA
May 3, 2006

The City Council of the City of El Centro does hereby resolve as follows:

WHEREAS the California Legislature enacted Assembly Bill 797 (Water Code Section 10610 et seq., known as the Urban Water Management Planning Act) during the 1983-1984 Regular Session, and as amended subsequently, which mandates that every supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre feet of water annually, prepare an Urban Water Management Plan, the primary objective of which is to plan for the conservation and efficient use of water; and

WHEREAS the City is an urban supplier of water providing water to a population over 17,000, and

WHEREAS the Plan shall be periodically reviewed at least once every five years, and that the City shall make any amendments or changes to its plan which are indicated by the review; and

WHEREAS the Plan must be adopted after public review and hearing, and filed with the California Department of Water Resources within thirty days of adoption; and

WHEREAS the City has therefore, prepared and circulated for public review a draft Urban Water Management Plan, and a properly noticed public hearing regarding said Plan was held by the City Council on May 3, 2006, and

WHEREAS the City of El Centro did prepare and shall file said Plan with the California Department of Water Resources by June 3, 2006;

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of El Centro as follows:

1. The 2005 Urban Water Management Plan is hereby adopted and ordered filed with the City Clerk; The Mayor is hereby authorized and directed to file the 2005 Urban Water Management Plan with the California Department of Water Resources within 30 days after this date;

   The Mayor is hereby authorized and directed to implement the Water Conservation Programs as set forth in the 2005 Urban Water Management Plan, which includes

water shortage contingency analysis and recommendations to the City Council regarding necessary procedures, rules, and regulations to carry out effective and equitable water conservation programs;

In a water shortage, the Mayor is hereby authorized to declare a Water Shortage Emergency according to the Water Shortage Stages and Triggers indicated in the Plan, and implement necessary elements of the Plan;

The Mayor shall recommend to the City Council additional regulations to carry out effective and equitable allocation of water resources; and

The attached budget is approved and authorized for implementation.

ADOPTED this 3rd day of May 2006, by the following vote:

AYES:
NOES:

ABSENT:
ABSTAIN:

ATTEST: _____
City Clerk,

City Council Members (indicate names)
Mayor
Director, Public Works Department
Chief, Water Department

Approved as to Form and Legality: _____
City Attorney

APPENDIX C

EL CENTRO'S WATER SHORTAGE INFORMATION

No-Waste Ordinance

Resolution to Declare a Water Shortage Emergency

Moratorium on New Connections during a Declared Water Shortage

Water Shortage Rationing Allocation Method

No Waste Ordinance

CITY OF EL CENTRO
IMPERIAL COUNTY, CALIFORNIA
Date

The City Council of the City of El Centro does hereby resolve as follows:

The Municipal Code of the City of El Centro is hereby amended by adding Section XX to Chapter XX, to read as follows:

XX-5 PROHIBITING WASTEFUL USE OF WATER

REGULATIONS AND RESTRICTIONS ON WATER USE
It is hereby resolved by the City Council that in order to conserve the City's water supply for the greatest public benefit and to reduce the quantity of water used by the City's customers, that wasteful use of water should be eliminated. Customers of the City shall observe the following regulations and restrictions on water use:

1. No customer shall waste water. As used herein, the term "waste" means:

    a. Use of potable water to irrigate turf, ground-cover, shrubbery, crops, vegetation, and trees between the hours of 10:00 o'clock A.M. and 6:00 o'clock P.M. or in such a manner as to result in runoff for more than five (5) minutes;
    b. Use of potable water to wash sidewalks, walkways, driveways, parking lots, open ground or other hard surfaced areas except where necessary for public health or safety;
    c. Allowing potable water to escape from breaks within the customer's plumbing system for more than twenty-four hours after the customer is notified or discovers the break;
    d. Washing cars, boats, trailers, aircraft, or other vehicles by hose without a shutoff nozzle and bucket except to wash such vehicles at commercial or fleet vehicle washing facilities using water recycling equipment.
    e. Use of potable water to clean, fill or maintain decorative fountains, lakes or ponds.

2. The following restrictions are effective during a declared Water-Shortage Emergency.

    a. No restaurant, hotel, cafe, cafeteria or other public place where food is sold, served or offered for sale, shall serve drinking water to any customer unless requested.
    b. Use of potable water for construction, compaction, dust control, street or parking lot sweeping, building wash down where non-potable water is sufficient.
    c. Use of potable water for sewer system maintenance or fire protection training without prior approval by the Mayor;
    d. Use of potable water for any purpose in excess of the amount allocated.

3. Other restrictions may be necessary during a declared Water Shortage Emergency, to safeguard the adequacy of the water supply for domestic, sanitation, fire protection, and environmental requirements.

Enforcement

Any customer violating the regulations and restrictions on water use set forth in this chapter shall receive a written warning for the first such violation. Upon a second violation, the customer shall receive a written warning and the district may cause a flow-restrictor to be installed in the service. If a flow-restrictor is placed, the cost of installation and removal shall be paid by the violator. Any willful violation occurring subsequent to the issuance of the second written warning shall constitute a misdemeanor and may be referred to the City Attorney's Office for prosecution. The City may also disconnect the water service. If water service is disconnected, it shall be restored only upon payment of the turn-on charge fixed by the City Council.

Penalty for violations

Except as provided in the enforcement section for the first and second violations any person, firm, partnership, association, corporation or political entity violating or causing or permitting the violation of any of the provisions of this section or providing false information to the City in response to City's requests for information needed by the City to calculate consumer water allotments shall be guilty of a misdemeanor punishable by imprisonment in the county jail for not more that thirty days or by a fine not exceeding one thousand dollars or both. Each separate day or portion thereof in which any violation occurs or continues without a good faith effort by the responsible party to correct the violation shall constitute a separate offense and, upon conviction thereof, shall be separately punishable.

Appeals

Variances from the requirements of this Section may be granted by the City Council only after denial of a variance request by the City Manager. Appeals of variance request denials shall be made in writing to the City Clerk at least 2 weeks prior to the meeting at which they will be heard. Upon granting any appeal, the City Council may impose any conditions it determines to be just and proper. Variances granted by the City Council shall be prepared in writing and furnished to the applicant.

Remedies/Cumulative

The remedies available to the City to enforce this ordinance are in addition to any other remedies available under the City's code or any state statutes or regulations, and do not replace or supplant any other remedy, but are cumulative.

Resolution to Declare a Water Shortage Emergency

CITY OF EL CENTRO
IMPERIAL COUNTY, CALIFORNIA
Date

The City Council of El Centro does hereby resolve as follows:

PURSUANT to California Water Code Section 350 et seq., the Council has conducted duly noticed public hearings to establish the criteria under which a water shortage emergency may be declared.

WHEREAS, the Council finds, determines and declares as follows:

(a) The City is the water purveyor for the property owners and inhabitants of El Centro;

(b) The demand for water service is not expected to lessen.

(c) When the potable water supply available to the City falls at or below the Stage II triggering levels described in the 2005 Urban Water Management Plan, the City will declare a water shortage emergency. The water supply would not be adequate to meet the ordinary demands and requirements of water consumers and there may be insufficient water for human consumption, sanitation, fire protection, and environmental requirements. This condition is likely to exist until groundwater contamination is remedied and/or water system damage resulting from a disaster are repaired and normal water service is restored.

NOW, THEREFORE, BE IT RESOLVED that the City Council of El Centro hereby directs the Mayor to find, determine, declare and conclude that a water shortage emergency condition exists that threatens the adequacy of water supply, until the City's water supply is deemed adequate and potable. After the declaration of a water shortage emergency, the Mayor is directed to determine the appropriate Rationing Stage and implement the City's Water Shortage Emergency Response.

FURTHERMORE, the Council shall periodically conduct proceedings to determine additional restrictions and regulations which may be necessary to safeguard the adequacy and quality of the water supply for domestic, sanitation, fire protection, and environmental requirements.

Moratorium On New Connections During A Water Shortage

CITY OF EL CENTRO
IMPERIAL COUNTY, CALIFORNIA
Date

The City Council of El Centro does hereby resolve as follows:
The Municipal Code of the City of El Centro is hereby amended to read as follows:

XX-5 MORATORIUM ON SERVICE COMMITMENTS AND CONNECTIONS

1 When the City declares a water shortage emergency, the following regulations shall become effective immediately and shall continue in full force and effect to prohibit the following while it remains in full force and effect:
   a. The City shall not issue oral or written commitments to provide new or expanded water service, including will-serve letters.
   b. The City shall not sell meters for water service connections, despite the prior issuance of will-serve letters or other oral or written service commitments, unless building permits have been issued.
   c. The City shall not provide new or expanded water service connections, despite the prior issuance of will-serve letters or other oral or written service commitments and meters, unless building permits have been issued.
   d. The City shall not provide water for use on any new plantings installed after the declaration of a Water Shortage Emergency.
   e. The City shall not annex territory located outside the City's service boundary.

2. The following uses are exempt from the moratorium and upon application to the City shall receive necessary water service commitments and connections to receive water from the City:
   a. Uses, including but not limited to, commercial, industrial, single and multifamily residential, for which a building permit has been issued by the City on or before the declaration of a Water Shortage Emergency.
   b. Uses, including but not limited to, commercial, industrial, single and multifamily residential, for which a retail meter had been purchased from the City before the declaration of a Water Shortage Emergency, as evidenced by a written receipt and for which a building permit has been issued and remains in full force and effect.
   c. Publicly owned and operated facilities, including but not limited to schools, fire stations, police stations, and hospitals and other facilities as necessary to protect the public health, safety and welfare.

Water Shortage Rationing Allocation Method

Single-family account allocations may be determined as follows: assuming 4 persons or less per home, an account would receive 11 HCF per month (68 gpcd) plus 55% of their historic use, not to exceed an upper limit. The upper limit on additional water may be 30 HCF per year (i.e., 132 HCF + 50% historic ≤ 162 HCF a year). Appeals would be available for additional people. For each additional person at a home the allotment is increased by 4 HCF per billing period (49 gcd).

Multi-residential account allocations may be determined as follows: assuming 3 persons or less per unit, accounts receive 6 HCF per unit per month (49 gcd), plus 40% of their historic use, not to exceed an upper limit. The upper limit on additional water may be 10 HCF per year per unit (i.e., 72 HCF + 40% historic ≤ 82 HCF a year). Appeals would be available for additional people. For each additional person, the allotment increases by 4 HCF per billing period (49 gcd).

Increased allocations for residential accounts would be limited to the following:

1. Greater number of residents than assumed by plan.
2. Medical conditions requiring additional water.

Commercial, Industrial and Institutional would receive a percentage reduction from historical use. The historical use period used to determine the baseline amount may vary based on specific factors. Appeals would be available for increased business, census or other factors.

APPENDIX D

Rate Stabilization Fund Discussion

Establishment of a Rate Stabilization Fund

In order to mitigate the financial impacts of a water shortage, the City is establishing an Emergency Fund. The goal is to maintain the fund at 75% of normal water department revenue. This fund will be used to stabilize rates during periods of water shortage or disasters affecting the water supply. The City will not have to increase rates as much or as often during a prolonged or severe shortage.

However, even with the emergency fund, rate increases will be necessary during a prolonged water shortage. As described in this Plan, a Stage II shortage will be accompanied by a 15-25% reduction in water deliveries while a Stage III will be accompanied by a 25 -35% reduction. The experiences of California water purveyors during the 1990-91 water shortage demonstrated that actual water use reductions by customers are usually considerably larger that those requested by the supplier. During the 1990-91 water shortage it was also politically difficult for many agencies to adopt the rate increases necessitated by a 20% to 50% reduction in sales. When a Water Shortage Emergency is declared, the supply shortage will trigger the appropriate Rationing Stage and rate increase.

Water rates increase by the following percentages when the indicated Stages are implemented:

Stage I no rate increase

Stage II 25% increase over pre-shortage rates

Stage III 50% increase over pre-shortage rates

Stage IV 100% increase over pre-shortage rates

End of the Water Shortage Emergency
15% increase over pre-shortage rates (This rate increase should be re-evaluated every two years)

Most California water agencies, which experienced water shortages, found that customer demand did not return to pre-shortage levels. After a shortage, water department expenses are expected to drop below pre-shortage levels but water sales are not expected to rebound. In anticipation of reduced sales, after a declared shortage ends, the City's rates will be set for one year at 115% of the pre-shortage rates. Any excess revenues collected as a result of this rate adjustment will be used for the Rate Stabilization Fund.

APPENDIX E

Colorado River Delivery Agreement Federal Quantification Settlement Agreement

APPENDIX F

City of El Centro Department of Health Services Water Supply Permit

APPENDIX G

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